



* Visual simulation of the Project

ENVIRONMENTAL ASSESSMENT REGISTRATION DOCUMENT

Ocean Lake Wind Project

Prepared for: EverWind NS Holdings Ltd.
and Membertou Development Corporation



May 2026

EverWind NS Holdings Ltd.
2102, 1969 Upper Water St.
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May 6, 2026

Anthony Heggelin
Nova Scotia Environment & Climate Change
Environmental Assessment Branch
#2085 - 1903 Barrington Street
PO Box 442
Halifax, NS B3J 2P8

Dear Mr. Heggelin,

Re: Environmental Assessment Registration Document
Ocean Lake Wind Project

Please find enclosed the Environmental Assessment Registration Document for the Ocean Lake Wind Project.

The undersigned approves and accepts the contents, as submitted to Nova Scotia Environment & Climate Change, Environmental Assessment Branch.

Sincerely,



Trent Vichie
Founder and CEO
EverWind

EXECUTIVE SUMMARY

EverWind NS Holdings Ltd. (EverWind) and Membertou Development Corporation (together as the "Proponent") are proposing to construct and operate the Ocean Lake Wind Project (the "Project"), formerly referred to as Wind Farm 2 Wind Project. The Project is an onshore wind farm with up to 158 proposed wind turbines capable of generating up to 1,264 MW of renewable energy. The Project is part of the Proponent's Phase 2 renewable energy projects (Guysborough Wind Projects), being developed to support the production of Certified Green hydrogen and ammonia and other industrial uses in Nova Scotia. The Project will be constructed in the Municipality of the District of Guysborough (MODG), near the communities of New Harbour, Goldboro, Larry's River, Lundy, and Roachvale. The Project is predominantly located on Crown Land.

The Project layout was refined through multiple design iterations to reduce environmental effects. The Project meets all required setbacks and separation distances and prioritizes placing infrastructure in previously disturbed areas and using existing roads. Overall, more than 58% of the areas requiring vegetation removal are located in previously disturbed or naturally open habitats (such as cutover areas or barrens), and 42% of access roads follow existing routes.

The Project is considered a Class I Undertaking under Schedule A of the Nova Scotia Environmental Assessment Regulations, N.S. Reg. 26/95, and therefore, requires the registration of an Environmental Assessment (EA) Registration Document. The EA Registration Document has been completed in accordance with the requirements outlined in 'A Proponent's Guide to Environmental Assessment' (NSECC, 2025a), the 'Nova Scotia Class I Environmental Assessment Checklist' (NSECC, 2025e), and the 'Environmental Assessment Supplemental Checklist: Wind Energy Projects' (NSECC, 2025d).

The following valued components were identified and evaluated as part of this EA based on provincial guidance, desktop analysis, and subsequent field studies:

- Atmosphere and air quality
- Climate change
- Sound
- Shadow Flicker
- Geophysical environment
- Surface water and fish & fish habitat
- Wetlands
- Terrestrial vegetation communities and flora
- Terrestrial fauna
- Bats
- Avifauna
- Economy
- Land use
- Archaeological resources

The results of the assessment indicated that the Project, with the implementation of mitigation and monitoring measures, will not result in significant adverse residual effects. The Project is being developed to support the production of Certified Green hydrogen and ammonia, as well as other industrial applications in Nova Scotia, contributing to a reduction of greenhouse gas emissions through renewable energy production while promoting local economic prosperity.

The Proponent has engaged and collaborated with local communities, the Mi'kmaq of Nova Scotia, and government representatives to identify and consider potential concerns associated with the Project, and to inform Project planning and mitigation measures, and will continue to do so as the Project progresses.

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LIST OF ACRONYMS

%	Percent
°	Degree
°C	Degrees Celsius
µg/m ³	Micrograms per cubic meter
µm	Micrometres
µS/cm	Microsiemens per centimeter
AAQMS	Ambient air quality monitoring stations
ACCDC	Atlantic Canada Conservation Data Centre
AMO	Abandoned mine opening
AQHI	Air Quality Health Index
ARD	Acid rock drainage
ARIA	Archaeological Resource Impact Assessment
ARS	Avian radar system
ARU	Autonomous recording units
ATC	All-terrain vehicle
BE	American beech
BF	Balsam fir
BMPs	Best management practices
BS	Black spruce
BT	Biological targets
BT/km ³	Biological targets per cubic kilometre
CB	Coastal Boreal
CBA	Community Benefits Agreement

CBEA	Community Benefit Fune
CCME	Canadian Council of Ministers of the Environment
CEA	Cumulative Effects Assessment
CEPA	<i>Canadian Environmental Protection Act, 1999</i>
CH ₄	Methane
CLC	Community Liaison Committee
cm	Centimetres
CNWI	Canadian Wetland Inventory
CO	Carbon monoxide
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRM Group	Cultural Resource Management Group Ltd
CWS	Canadian Wildlife Service
dBA	A-weighted decibels
DBH	Diameter at breast height
DEM	Digital elevation model
DFO	Fisheries and Oceans Canada
DND	Department of National Defence
DWC	Diurnal watch count
EA	Environmental Assessment
ECCC	Environment and Climate Change Canada
EMI	Electromagnetic interference
EPFU	Big brown bat
ERT	Emergency Response Team
ESA	<i>Endangered Species Act, S.N.S. 1998, c. 11</i>
FAC	Facultative
FACU	Facultative upland
FACW	Facultative wetland
FEC	Forest Ecosystem Classification
FTE	Full-time equivalent
FWAL	Freshwater aquatic life
gCO ₂ e/kWh	Grams of CO ₂ equivalent per kilowatt-hour of energy produced
GDP	Gross domestic product
GHG	Greenhouse gas
GIS	Geographic information system
GPS	Global positioning system
GW	Gigawatts
H ₂ S	Hydrogen sulfide
ha	Hectare
HADD	Harmful alteration, disruption, and destruction
HSI	Habitat suitability index
Hz	Hertz

IBA	Important bird areas
ID	Identification
IH	Intolerant hardwood
IPCC	Intergovernmental Panel on Climate Change
kg	kilograms
kHz	Kilohertz
km	Kilometre
km/h	Kilometres per hour
km ²	Square kilometre
KMKNO	Kwilmu'kw Maw-klusuaqn Negotiation Office
kWh/year	Kilowatt-hours per year
LAA	Local Assessment Area
LABO	Eastern red bat
LACI	Hoary bat
LANO	Silver-haired bat
LCA	Lifecycle assessment
LFN	Low frequency noise
LiDAR	Light Detection and Ranging
LIT	Long-lived intermediate-tolerant tree species
LT	Late-successional tree species
m	Metre
M&NP	Maritimes & Northeast Pipeline
m/s	Metres per second
m ²	Square metres
m ³	Cubic metres
masl	Metres above sea level
MBA	Mi'kmaq Benefits Agreement
MBBA	Maritimes Bird Breeding Atlas
MBCA	<i>Migratory Bird Conservation Act, 1994</i>
MBS	Maritime Breeding Sanctuaries
MD	Municipal district
MEKS	Mi'kmaq Ecological Knowledge Study
MET	Meteorological
MHz	Megahertz
MLA	Member of the Legislative Assembly
mm	Millimetre
MODG	Municipality of the District of Guysborough
MOU	Memorandum of Understanding
MP	Member of Parliament
MPRR	Minimum Planning Requirements Regulations
MTRI	Mersey Tobeatic Research Institute
MW	Megawatts
MW	Mixedwood

MWh/yr	Megawatt hours per year
MYOT	Myotis species
N ₂ O	Nitrous oxide
N/A	Not Applicable
nBTs	Number of biological targets
NI	No indicator
NL	Not listed
NO	Nitric oxide
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxide
NHRRRA	New Harbour River Restoration Association
NS AAQS	Nova Scotia Ambient Air Quality Standards
NS Power	Nova Scotia Power Incorporated
NSAQR	Nova Scotia Air Quality Regulations
NSCCTH	NS Communities, Culture, Tourism and Heritage
NSECC	Nova Scotia Environment and Climate Change
NSF	Nova Sustainable Fuels
NSNC	Nova Scotia Native Council
NSNR	Nova Scotia Natural Resources
NSPW	Nova Scotia Public Works
O&M	Operations and maintenance
O ₃	Ozone
OBL	Obligate
OHV	Off-highway vehicle
OLA	Office of L'nu Affairs
OGPI	Old Growth Potential Index
OT	Optional turbines
PC	Point count
PESU	Tri-colored bat
pH	Potential of hydrogen
PF	Planted Forest
PID	Property identification
PM	Particulate matter
PM ₁₀	Particulate matter 10 micrometres or less in diameter
PM _{2.5}	Particulate matter 2.5 micrometres or less in diameter
ppb	Parts per billion
PPE	Personal protective equipment
PWC	Predicted watercourses
PWL	Predicted wetlands
Q&A	Question and answer
QA/QC	Quality Assurance/Quality Control
RAA	Regional Assessment Area
RABC	Radio Advisor Board of Canada

RM	Red maple
ROW	Right of way
RS	Red spruce
SAF	Sustainable aviation fluid
SANS	Snowmobilers Association of Nova Scotia
SAR	Species at risk
SARA	<i>Species at Risk Act</i>
SCADA	Supervisory control and data acquisition
SIG	Sipekne'katik Governance Initiative
SH	Spruce hemlock
SM	Sugar maple
SMP	Special management practices
SO ₂	Sulphur dioxide
SOCI	Species of conservation interest
SP	Spruce pine
S-Rank	Subnational rank
TC	Transport Canada
tCO ₂	Tonnes of carbon dioxide
tCO ₂ e	Tonnes of carbon dioxide equivalent
tCO ₂ e/kg	Tonnes of carbon dioxide equivalent per kilogram
tCO ₂ e/km	Tonnes of carbon dioxide equivalent per kilometer
tCO ₂ e/tonne	Tonnes of carbon dioxide equivalent per tonnes
tCO ₂ e/tonne·km	Tonnes of carbon dioxide equivalent per tonnes by kilometer
tCO ₂ e/year	Tonnes of carbon dioxide equivalent per year
TH	Tolerant hardwood
T/L	Eastern tamarack
TRS	Total reduced sulphur
TSP	Total suspended particulate
UNHI	Unknown high
UNKW	Unknown
UNLO	Unknown low
UPL	Upland
UTM	Universal Transverse Mercator
V	volt
VCs	Valued Components
VT	Vegetation type
WAM	Wet area mapping
WB	Wet Boreal
WC	Wet coniferous
WD	Wet deciduous
WM	Wet Mixedwood
WESP-AC	Wetland Ecosystem Services Protocol – Atlantic Canada
WSS	Wetland of special significance
YB	Yellow birch

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1.0 PROPONENT DESCRIPTION

EverWind NS Holdings Ltd. (EverWind) and Membertou Development Corporation (together as the “Proponent”) are proposing to construct and operate the Ocean Lake Wind Project (the “Project”), formerly referred to as the Wind Farm 2 Wind Project. The Project is an onshore wind farm with up to 158 wind turbines capable of generating up to 1,264 megawatts (MW) of renewable energy. The Project is part of the Proponent’s Phase 2 (Guysborough Wind Projects) renewable energy buildout in Guysborough, being developed to support the production of Certified Green hydrogen and ammonia and other industrial uses in Nova Scotia.

EverWind is a Nova Scotia-based energy and infrastructure company advancing green hydrogen and ammonia production and other industrial uses while operating established marine terminal, storage, and transportation assets.

The EverWind team includes experienced Canadian wind farm developers, constructors, and operators who have designed, financed, constructed, and operated wind and solar energy projects in Nova Scotia, Atlantic Canada, Western Canada, and across North America over the past 20 years. Together with deep expertise in marine operations and industrial infrastructure, this experience supports the safe development and operation of large-scale energy and industrial projects.

Membertou is a Mi’kmaw community located in Unama’ki-Cape Breton Island. Just 3 km from downtown Sydney, Membertou’s urban location, in addition to its prioritization of community development, has enabled it to grow into one of Canada’s most economically flourishing Indigenous communities.

With nearly 1,800 total members, Membertou’s approach to business and community starts with its people. Chief Terry Paul, who is the elected Chief in Membertou for the last 41 years, often remarks that, “at the forefront of everything we do, is who we do it for; the people of Membertou.”

Membertou Development Corporation was established in 1989 and over the last three decades has grown into a thriving organization that focuses on real estate, fisheries, gaming, trade and convention, retail development, and renewable energy. Through strategic acquisitions, Membertou has become not only a business leader, but an example of economic reconciliation. Membertou is a Canada’s Best Managed Company and has ownership in companies such as Clearwater Seafoods and NewDock-St. John’s Dockyard. Membertou holds strong partnerships in projects with Novaporte, EverWind Fuels, and others.

With a goal to provide opportunities, employment, and prosperity for the community, Membertou’s Chief and Council are keen to see continued growth, while always using the lens of environmental and cultural stewardship.

The Proponent retained Strum Consulting to undertake the required technical studies and undertake regulatory consultations to support the preparation of the Project's Environmental Assessment (EA) Registration Document. Strum Consulting is an independent multi-disciplinary team of consultants with extensive experience undertaking EAs throughout Atlantic Canada.

Contact information for the Proponent and their consultant is included in Table 1.1.

Table 1.1: Proponent and Consultant Contact Information

Proponent Information	
Project Name	Ocean Lake Wind Project
Proponent Name	EverWind NS Holdings Ltd. and Membertou Development Corporation
Chief Executive Officer(s) / Principal(s)	Trent Vichie – Chief Executive Officer and Founder EverWind Fuels
Proponent Contact Information for the EA Registration	Jeff Bonazza –Director Environment and Permitting EverWind Fuels 902-292-7010 jeff.bonazza@everwindfuels.com
Mailing and Street Address	1969 Upper Water Street – Suite 2101 Purdy's Wharf II Halifax, NS B3J 2V1
Consultant Information	
Name of Consultant	Strum Consulting
Mailing and Street Address	211 Horseshoe Lake Road, Unit #210 Halifax, NS B3S 0B9
EA Contact	Angus Doane – Project Manager Environmental Assessments and Approvals Strum Consulting 902-835-5560 adoane@strum.com

2.0 PROJECT INFORMATION

2.1 Project Introduction

The Proponent's overall vision is to develop an Atlantic Canada energy hub in Point Tupper, Nova Scotia. The Project aims to utilize renewable energy sources, such as wind energy, to produce green hydrogen and ammonia (for both local use and export) and other industrial uses. The portfolio of projects is divided into two phases in Nova Scotia:

- Phase 1 includes the construction of the Point Tupper Energy Hub (the "Facility"). EA Approvals have been received for the Point Tupper Green Hydrogen and Ammonia Plant and four wind projects (Bear Lake, Kmntuk, Windy Ridge, and Upper Afton Wind

Projects). Phase 1 wind power projects use the existing Nova Scotia Power Inc. (NS Power) grid to transmit renewable energy to Point Tupper for the Facility.

- Phase 2 includes the development of approximately 2 gigawatts (GW) of clean energy from up to three additional onshore wind projects, the associated high-voltage transmission line, and the portion of the high-voltage transmission line that crosses the Strait of Canso to provide a connection directly to the Facility. Phase 2 wind power projects will transmit renewable energy to the Facility via EverWind constructed, owned, and operated transmission lines. The Strait Crossing Transmission Line and Setapuktuk Wind Power Project, the first two components of Phase 2, both received EA approval in 2025.

This Project is the second of the Phase 2 onshore wind projects, with up to 158 wind turbines, capable of generating up to 1,264 MW of renewable energy near the communities of New Harbour, Goldboro, Larrys River, Lundy, and Roachvale in the Municipality of the District of Guysborough, in Guysborough County, Nova Scotia (Drawing 2.1). The approximate center of the Project is located at 45.236163°N 61.535765°W.

The Goldwind GWH182-8.0 wind turbine generator was selected for the visual simulations, noise, and shadow flicker modelling, as well as the electromagnetic interference (EMI) study conducted for this EA. The planned Project infrastructure also includes access roads (new and existing), temporary laydown areas, medium-voltage collector lines, one or more substations, worker accommodations, a concrete batch plant, meteorological towers (MET towers), borrow pits, and an Operations and Maintenance (O&M) building.

Upon approval of the EA, site preparation and construction activities are proposed to begin in 2029 (lasting approximately five years) and once constructed, the Project is expected to be operational for a minimum of 35 years.

2.2 Purpose & Need for the Undertaking

As part of the Clean Power Plan released in fall 2023, the Government of Nova Scotia set targets for producing 80% renewable energy by 2030 and cutting greenhouse gas (GHG) emissions produced from electricity by 90%. The development of wind energy is expected to be a significant part of achieving these goals. The Project has been proposed in support of this renewable energy target. Dependence on fossil fuels increases the vulnerability of Nova Scotians to rising international energy prices, weakens energy security, and takes valuable revenue out of the province, further leading Nova Scotia towards a preference for renewable energy (Nova Scotia, 2015). Negative impacts on human health (particularly in developing countries) and the environment, mainly in the form of climate change, are among the widely cited challenges associated with fossil fuel consumption around the world.

In its assessment report, Climate Change 2022 - Impacts, Adaptation and Vulnerability, the United Nations Intergovernmental Panel on Climate Change (IPCC) provides a detailed synopsis of the impacts associated with climate change on both global and regional scales.

Evidence from all continents indicates that many biological systems and habitats are currently being affected by regional climate change. Ecological changes include those to the thermal dynamics and quality of aquatic habitats, shifts in migratory timing and ranges of fauna and flora, changes in fish abundance, and increased risk of extinction and loss of forest habitat (IPCC, 2022). In North America specifically, the increase in ground, water, and atmospheric temperatures has resulted in direct mortality and redistribution of flora and fauna species. In addition, coastal flooding along with an increase in the frequency and intensity of extreme weather events will continue to impact the socioeconomic environment through displacement and/or damage to communities and economies (IPCC, 2022). Impacts of climate change are, and will increasingly be felt across environmental, social, human health, and economic sectors (IPCC, 2022).

Canadian climate experts acknowledge that the debate has largely evolved from questions about the reality and causes of climate change, to what actions can be taken to adapt to the realities of a changing climate. As the second most important and fastest growing source of electricity in Canada (along with solar) (NRCan, 2024), wind energy is a critical component of Canada's renewable energy strategy. Wind energy is emission-free; with every megawatt of wind energy generated, GHG emissions are reduced in comparison to previous levels associated with coal-related production (NSNR, n.d.-b). Numerous benefits can be expected from the transition to renewable energy, including:

- Long-term stability in energy prices.
- Long-term security in locally-sourced energy supply and decreased dependence on international markets.
- Creation of jobs and economic opportunities throughout the province.
- Community investment and economic return.
- Protection of human health and the environment.
- Educational opportunities for youth and the broader community about renewable energy technology, its benefits, and the role it will play in Nova Scotia's energy future.

The Proponent is committed to sharing economic opportunities with the local community throughout the development and lifespan of the Project via the use of local skills and labour where practicable, municipal tax revenue, and ongoing energy literacy/education. Engagement with local groups has been ongoing to support both community and Project development.

2.3 Regulatory Framework

2.3.1 Federal

A federal impact assessment is not required for the Project as it is not located on federal lands or listed as a physical activity that constitutes a designated project as listed in the Physical Activities Regulations (Canada, 2019a), under the *Impact Assessment Act* (Canada, 2019b).

Federal approval, permit, notification, and compliance requirements for the Project are provided in Table 2.1. EMI and radio communication stakeholders have been contacted. The EMI consultation process and status is described further in Section 6.

Table 2.1: Federal Regulatory Requirements

Requirement	Regulatory Body	Status/Comments
<i>Fisheries Act</i>	Fisheries and Oceans Canada (DFO)	Compliance legislation - there is currently no expectation that an authorization under the <i>Fisheries Act</i> will be required. DFO will review watercourse alteration applications to determine potential to cause harmful alteration, disruption, or destruction of fish habitat or accidental death of fish. All fish surveys were conducted under DFO Scientific Licence #360444.
<i>Species at Risk Act</i> (SARA)	Environment and Climate Change Canada (ECCC), and DFO	No SARA permits were acquired for studies within the Study Area and none are expected based on Project design. Should the need to obtain a permit under SARA be identified, the Proponent will engage with ECCC and/or DFO, as appropriate.
<i>Migratory Bird Convention Act, 1994</i> (MBCA)	ECCC	Compliance legislation – the requirement to obtain a MBCA permit is not anticipated.

2.3.2 Provincial

The Project is subject to a Class I EA as defined by the Environmental Assessment Regulations (Nova Scotia, 1995c) under the *Environment Act* (Nova Scotia, 1995b). As such, this submission has been prepared in accordance with:

- A Proponent's Guide to Environmental Assessment (NSECC, 2025a)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a)
- Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025e)
- Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d)

Other potentially applicable regulatory requirements including provincial approvals, permits, notification, and compliance for the Project along with their status are provided in Table 2.2.

Table 2.2: Provincial Regulatory Requirements

Requirement	Regulatory Body	Status/Comments
Watercourse Alteration Permit Wetland Alteration Permit	Nova Scotia Environment and Climate Change (NSECC)	Alteration applications will be submitted to NSECC in accordance with the Activities Designation Regulations following EA Approval. Locations requiring alteration are described in Section 9.
<i>Endangered Species Act</i> (ESA) (Nova Scotia, 1998)	Nova Scotia Natural Resources (NSNR)	Compliance legislation – should the need to obtain a permit under the ESA be identified, the Proponent will engage with NSNR.

Requirement	Regulatory Body	Status/Comments
Use of Crown lands	NSNR	In 2022, EverWind received an MOU for use of Crown Lands for the purpose of developing a wind energy generating facility – the Project falls within the awarded Crown lands. Crown Land leases and easements will be applied for following EA approval and further project development work.
Notification of blasting (if required)	NSECC, Nova Scotia Health and Safety	To be confirmed following the geotechnical investigations.
Overweight/Special move permit Access permit Work within highway right-of-way (ROW)	Nova Scotia Public Works (NSPW)	Permits to be applied for before mobilizing oversize vehicles on public roads or commencing within a highway ROW.
Elevator lift license	Nova Scotia Labour Skills and Immigration	Application to be filed prior to erection of the wind turbines.
Archaeology Field Research Permit	Nova Scotia Communities, Culture, Tourism and Heritage (NSCCTH)	NSCCTH Permit A2026NS044 obtained to complete the archaeology assessment (Section 9).
Nova Scotia Temporary Workplace Traffic Control Manual	NSPW	Compliance for the use of provincial roads during the construction, operation, and decommissioning phases of the Project.

2.3.3 Municipal

Municipal approval, permit, notification, and compliance requirements for the Project are provided in Table 2.3.

Table 2.3: Municipal Requirements

Requirement	Regulatory Body	Status/Comments
Building and Development Permits	Municipality of the District of Guysborough (MODG)	Proponent will obtain all required municipal building and development permits prior to construction.
Noise Control By-Law	MODG	Compliance with schedule restrictions for construction activities. By-law includes provisions to permit construction activities during specific hours if a Building Permit has been issued.

2.4 Funding

The Proponent is arranging equity and debt project financing for the Project. Leading investment banks are engaged to lead the financing of the Project. Commercial banks have been approached to participate in the Project as a lender, and various financing support letters have been received for the funding.

3.0 DESCRIPTION OF THE UNDERTAKING

3.1 Geographical Location

The Project is located within Guysborough County, near the communities of New Harbour, Goldboro, Larrys River, Lundy, and Roachvale, Nova Scotia (Drawing 2.1). The Project is situated almost entirely on Crown-owned, managed forestry land. The Project is centered at approximately 45.236163°N 61.535765°W.

3.2 Areas of Study

EverWind entered into a Memorandum of Understanding (MOU) with the Province in 2022 respecting Crown lands identified for potential wind generation development. The proposed Project is located within the area covered by that MOU.

Several areas of study were established for the purpose of field data collection and to describe the area containing Project infrastructure.

- Study Area: A Study Area was established based primarily on land parcels (i.e., PIDs) that encompass the development area (Drawing 2.1). The intent of the Study Area was to assess a large area at a high-level to allow flexibility in the design to move infrastructure and minimize effects to valued components (VCs; described further in Section 4.1). Based on the resulting Study Area analyses, an Assessment Area was established for more detailed field investigations. Note that not all PIDs included in the Study Area contain or are expected to contain Project infrastructure, as detailed in Appendix A.
- Assessment Area: An Assessment Area (Drawings 3.1A to 3.1Q) was established for more detailed field assessment planning. The Assessment Area represents the area within which direct physical disturbance is expected to occur (i.e., the Project Footprint) plus a buffer to allow design flexibility and assess indirect effects beyond the direct Project Footprint. The Assessment Area buffer generally includes a 150 m radial area around each turbine and a 35 m buffer on either side of the centerline for roads and collector lines. The Assessment Area also includes temporary laydown areas.

As field studies progressed, further Project design changes were made to avoid sensitive features and reduce potential adverse effects on VCs, which in some instances changed the noted assessment buffers.

- Clearing Footprint: A Clearing Footprint (Drawing 3.1A to 3.1Q) was established, which includes the areas where vegetation clearing may be required to facilitate construction

activities, including temporary laydown areas, collector line corridors, and access roads. Many of these areas will be allowed to revegetate during operations. The Clearing Footprint includes the full width of the Assessment Area along roads and collector lines, temporary laydown areas, as well as a 100 m by 100 m area surrounding turbine locations.

The Clearing Footprint is a conservative estimate of the footprint where vegetation clearing will take place during construction and includes existing roads and previously cleared areas. The final area requiring vegetation clearing is expected to be less than the Clearing Footprint presented in this document.

- **Project Footprint:** The Project Footprint (Drawing 3.1A to 3.1Q) includes the physical footprint where direct disturbance is expected to occur. The Project Footprint includes a conservative estimate of 30 m wide corridors for road construction and upgrades, collector line installation, and a 100 m by 100 m area surrounding turbine locations.

The areas for the areas of study are provided in Table 3.1.

Table 3.1: Area of Study

Area of Study	Area (ha)
Study Area	22,055
Assessment Area	2,534
Clearing Footprint ⁽¹⁾	1,716
Project Footprint ⁽²⁾	785

(1) Area is a conservative estimate of the footprint where vegetation clearing will take place during construction.

(2) Area is a conservative estimate of the permanent footprint of the Project. Temporary Footprint components are shown on Drawing 3.1A to 3.1Q but not included in this calculation. Following detailed design, the area will be refined.

The location for O&M buildings, the temporary worker accommodations, and one or more substations have not yet been determined and are not shown on Drawing 3.1A to 3.1Q or included in the Table 3.1 calculations. For the purposes of this EA, the Project has been assessed using conservative spatial envelopes and buffers intended to capture the potential area of direct and indirect effects associated with these components. Final locations will be selected considering environmental constraints, permitting requirements, and engineering considerations. No construction will occur in any area requiring additional field verification until those assessments have been completed and applicable approvals have been obtained.

3.3 Siting Considerations

Project siting was completed using a multi-phased approach, including a detailed constraints analysis primarily consisting of a geographic information system (GIS) exercise after considering land ownership, setbacks, and wind speed to develop a preliminary layout. Siting considerations included:

- Siting turbines at locations for efficient capture of wind energy.
- Utilizing existing disturbed areas to the greatest extent practical.

- Complying with regulated setbacks and separation distances (Table 3.2).
- Minimizing potential interference with telecommunication and radar systems.
- Avoiding known protected areas; and wildlife sites, provincial parks, or reserves.

Table 3.2: Summary of Minimum Setbacks and Separation Distances

Setback Category	Distance	Relevant Regulators / Stakeholders
Watercourses	30 m from watercourses, where possible or otherwise where authorized by NSECC	NSECC
Wetlands	30 m from wetlands, where possible or otherwise where authorized by NSECC	NSECC, NSNR
Wetlands of Special Significance (WSS)	30 m from WSS, to be determined in consultation with NSECC	NSECC, NSNR
Old Growth Forests	100 m limited development buffer where practicable on Crown land	NSNR
Protected Areas	To be determined in consultation with NSECC, as appropriate	NSECC, NSNR
Rare Plants and Lichens	Species-specific (Section 10.1)	NSNR
Residential Dwellings (non-participating)	4.0 x Turbine Height	Nova Scotia Municipal Affairs (NSMA)
Camps (non-participating)	350 m	Proponent Commitment
External Property Boundaries (non-participating)	1.0 x Turbine Height	MODG
Public Roads	As per municipal requirements (minimum 1.0 x turbine height)	Proponent Commitment
Powerlines	1.0 x Turbine Height from non-Project-related powerlines	Proponent Commitment
Shadow Flicker	As necessary to meet shadow flicker guidelines based on shadow flicker modelling	NSECC
Sound/Noise	As necessary to meet sound / noise guidance based on sound modelling	NSECC

The Loon Lake Nature Reserve falls within the Study Area and is directly adjacent to the Assessment Area (Drawing 3.1A to 3.1Q). The nearest Turbine (T21) is approximately 275 m away, though road upgrade activities are expected to occur directly adjacent to the nature reserve. The Proponent respects the integrity and importance of protected areas and has engaged with NSECC Protected Areas regarding appropriate precautions for the nature reserves and protected areas (Section 6).

The Project Footprint has been developed to minimize potential effects to surrounding land uses, local residents, and environmental features. Project development considerations included the following:

- Use of Crown land which has been subject to previous and ongoing disturbance from forestry activities.
- Use of existing roads and cleared areas to the extent practicable, to minimize habitat fragmentation and impacts to wetlands, watercourses, and their riparian buffers from new road construction and clearing of mature vegetation stands.
- Avoidance of known species at risk (SAR) locations, and associated buffers where practicable.

Project siting constraints were updated with the results of Project-specific technical studies which included: field investigations, environmental resource/potential effects modeling, as well as information collected through engagement with the Mi'kmaq of Nova Scotia, government agencies, stakeholders, and local communities. Through this process, several iterations of the Project layout were considered (Drawing 3.2) for development before a Project Footprint was finalized for the purposes of this EA.

Specific adjustments included relocation of Project infrastructure, and an overall reduction in turbine numbers from 162 to 158, to:

- Remove or relocate of turbines from the NexGold Goldboro Gold project area.
- Avoid and minimize interactions with old growth forests, SAR, wetlands, and watercourses.
- Avoid the Maritimes and Northeast Pipeline.
- Maintain setbacks from Nature Reserves.
- Maintain setbacks from potential receptors.

The Project has been carefully designed to minimize environmental and land use impacts as far as reasonably practicable, with design modifications made in response to multiple years of environmental field studies and community engagement. Due to the size, scale, and complexity of the Project, additional refinements will likely be required as development advances. This refinement process constitutes an optimization exercise, reflecting the reality that projects of this magnitude cannot fully avoid or minimize all potential impacts individually; enhancing performance in one area may necessarily result in trade-offs that affect other VCs. Final siting decisions will continue to balance environmental constraints, engineering requirements, safety, and land use considerations. The Proponent will work with government departments throughout the detailed design and permitting process to manage potential impacts resulting from site optimization.

3.4 Project Proximity to Other Areas

3.4.1 Towns or Cities

The Project is situated approximately 15 km south of the community of Guysborough, and 35 km northeast of the community of Sherbrooke (Drawing 3.3). Mulgrave is the nearest town,

located 43 km north of the Project, and the town of Antigonish is 55 km northwest of the Project.

3.4.2 Mi'kmaq Communities

The nearest Mi'kmaq communities are Paqtnkek-Niktuek Indian Reserve No. 23 (Paq'tnkek) which is 44 km northwest of the Project, and Chapel Island Indian Reserve No. 5 (Potlotek) which is 78 km northeast of the Project (Drawing 3.3). Refer to Section 5 for additional details on the Mi'kmaq of Nova Scotia.

3.4.3 Other Known Wind Developments

Other wind developments within proximity to the Project include the Sable Wind Project located 43 km northeast of the Project, the proposed Setapuktuk Wind Project located 33 km north of the Project, the proposed Upper Afton Wind Project located 36 km northwest of the Project, the Mulgrave Community Wind Power Project located 43 km north of the Project, the Auld's Cove Wind Project located 32 km northwest of the Project, and the proposed Wind Farm 3 Project location 25 km southwest of the Project. EverWind is the proponent of the Setapuktuk, Upper Afton and Wind Farm 3 Wind Projects.

3.4.4 Protected Watersheds and Water Areas

Landrie Lake Watershed Protected Water Area is the nearest protected water area to the Project. It is located 31 km northeast of the Project, across the Strait of Canso, in Richmond County, Cape Breton (Drawing 3.3).

3.4.5 Nearest Parks and Protected Areas

The Loon Lake Nature Reserve is situated within the Study Area and adjacent to the Project Footprint (Drawing 3.1A to 3.1 Q). This Nature Reserve totals 384 ha and protects a small tract of hardwood dominated forest that is typical of the natural landscape of the area. (NSECC, n.d.-b) The closest turbine is approximately 275 m southwest of this nature reserve. The pending Isaacs Harbour River Wilderness Area, Guysborough Headlands Wilderness Area, and Chedabucto Fault Nature Reserve are also directly adjacent to the Study Area. The nearest turbine to each is approximately 1,850 m, 305 m, and 417 m respectively. The closest turbine is approximately 1 km north of the nearest provincial park, New Harbour Provincial Park (Drawing 3.1A to 3.1Q). Cape Breton Highlands National Park, the nearest national park to the Project, is 165 km to the north.

3.4.6 Important Bird Areas

The closest Important Bird Area (IBA) is the Country Island Complex (NS028), a series of islands off the coast between the communities of Tor Bay and Drum Head. The closest island is located approximately 2.4 km southwest of the Study Area, while the furthest is located approximately 11.5 km west of the Study Area (Drawing 3.3).

3.5 Physical Components

3.5.1 Turbines

The Proponent is proposing the construction of up to 158 turbines, with a total nameplate capacity of up to 1,264 MW. Optional turbine locations (OTs) have been evaluated throughout the EA, with the exception of sound and shadow flicker modelling, which will be updated at a later date to ensure compliance, should these turbines be proposed for construction (Section 7.3 and 7.4).

The turbine model for the Project has not been finalized. However, for the purposes of the EA, the Proponent has selected the Goldwind GWH182-8.0 wind turbine generator as it is representative of the operating specifications of models being considered for the Project. Each turbine location, when constructed, will be comprised of a foundation, steel tower, rotor and blades, nacelle (including the rotor shaft and brake and gearbox system), and a cleared pad surrounding the turbine for construction and maintenance purposes. Table 3.3 shows the turbine characteristics of the Goldwind GWH182-8.0.

Table 3.3: Turbine Technical Specifications

Turbine Component	Turbine Specifications for Goldwind GWH182-8.0
Rated capacity	8.0 MW
Rotor diameter	183.4 m
Blade length	91.7 m
Hub height	130 m
Total turbine (tip) height	221.7 m
Cut-out wind speed	24.0 metres per second (m/s)
Number of blades	Three
Swept area	26,417 square metres (m ²)

Steel towers are the baseline consideration for the Project, however, the Proponent is considering concrete towers, manufactured on-site or nearby, to maximize local content and in response to international steel tariffs and other supply chain constraints. If a concrete tower configuration is selected, a greater hub height may be required, up to 150 m in height, to accommodate turbine design, structural engineering, and blade-to-tower clearance requirements associated with the selected tower and turbine configuration. Should this option be advanced, an updated Project Description will be submitted to NSECC, including updated noise and shadow flicker modelling and demonstration of setback compliance in accordance with the revised turbine height. It is expected that footprint-related effects would be unchanged.

3.5.2 Road Layout

An extensive road network currently exists in the Study Area and is associated with ongoing forestry activities. The proposed access roads consist of 129 km (58%) of new and 94 km (42%) of existing roads (Drawing 3.1A to 3.1Q). All roads will be constructed or upgraded, as

required to safely transport turbine components, provide appropriate turning radii, and support construction activities in compliance with local and provincial guidelines/requirements. During the civil design process, consideration will be made to minimize adverse impacts to sensitive habitats, such as wetlands and watercourses, as well as rare species, as practicable. In some cases, the construction of new roads will be required to access proposed turbine locations; however, the Proponent is planning to leverage the network of existing roads to the greatest extent feasible.

The Larrys River Road from Cooks Cove to Larrys River and Highway 316 (between the communities of Goldboro and Larrys River) are the main arterial roads that grant access to most of the Project Footprint. A vast network of smaller spur roads and trails suited for all-terrain vehicles (ATVs) and/or snowmobile use are present throughout much of the Study Area and may require upgrades to facilitate the transportation of turbine components.

3.5.3 Substation, Power Collection Systems, and Transmission

The Project will include new medium-voltage electrical cabling from each turbine, and one or more substations to gather the produced energy. The medium-voltage electrical cabling will be overhead, with the exception of the first approximately 100 m from each turbine which will run underground, and predominantly parallel to Project roads. Substation location(s) and high voltage transmission tie-ins will be determined during detailed design. Energy produced by the Project will be transmitted to Point Tupper via an EverWind-owned Phase 2 high-voltage transmission line, currently undergoing development.

3.5.4 Operations and Maintenance Building

The Project will require an O&M building, which will mainly consist of an electrical room, workshop, supervisory control and data acquisition (SCADA) room, parts room, conference room, and office spaces. The location and area that the O&M building will occupy have not yet been determined.

3.5.5 Worker Accommodation

The Project will require worker accommodation to house the large workforce required during the construction phase of the Project. The location is yet to be determined.

The Proponent has consulted with NexGold and Nova Sustainable Fuels (NSF) about the potential use of shared accommodations. Refer to Section 5 and 6 for more information.

3.5.6 Meteorological Towers

Three MET towers, operational since 2025, have been installed within the Study Area to monitor atmospheric conditions relevant to the Project (wind speed and direction, atmospheric pressure, relative humidity, and temperature). Additional MET towers and/or light detection and ranging (LiDAR) wind measurement systems may be required during the Project development. Several MET towers will be required during the Project operational period at locations yet to be determined.

3.5.7 Concrete Batch Plant

One or more concrete batch plants are likely to be used during construction. Concrete batch plants allow for high output and quality concrete to be produced at site and reduce trucking costs and impacts to local communities.

3.5.8 Temporary Laydown Yards

A total of 18 temporary laydown yards, between 3 ha and 12 ha in size, are under consideration for the Project. These areas will be used to temporarily store equipment, assemble Project infrastructure, locate concrete batch plants, and other Project construction activities. One or more of the laydown areas may be repurposed for substation or O&M building placement.

3.5.9 Borrow Pits

During construction, aggregate material for road construction may be produced from borrow pits located within the Study Area. All borrow pits are expected to be under 4 ha and not require an EA. Should any borrow pit be over 2 ha, an Industrial Approval will be obtained, as required. On-site borrow pits allow for aggregate to be sourced at the site and reduce trucking costs and impacts to local communities. If borrow pits are not utilized, aggregate will be sourced from local quarries.

3.6 **Project Phases**

The Project will include three phases:

- Site preparation and construction (approximately five years, tentatively starting in 2029).
- Operations (approximately 35 years, tentatively starting in 2034).
- Decommissioning (18 to 36 months, at Project end of life).

Activities and requirements associated with each phase are discussed in the following sections.

3.6.1 Site Preparation and Construction

Geotechnical investigations and land surveys for placement of roads, turbines, and associated infrastructure will be performed prior to site preparation and construction.

Site preparation activities include:

- Demarcating boundaries of environmentally sensitive features and applying appropriate buffers.
- Installing erosion and sedimentation control measures
- Clearing of trees, grubbing, excavating, grading, and compacting local and potentially imported materials for construction.

General construction activities include:

- Access road construction.
- Laydown area and turbine pad construction.
 - Completion of foundation excavation and construction, including blasting, if required.
 - Preparation of materials and storage (e.g., aggregate crusher and storage areas).
- Transportation of turbine components, equipment, and materials.
 - Establishment of site traffic control measures.
- On-site manufacturing of turbine towers (if concrete towers are used)
- Turbine assembly.
- Management of site waste and dust.
- Construction and connection of collection system, substation, and transmission lines.
- Removal of temporary works and site restoration.
- Commissioning.

Clearing activities are expected to be primarily performed outside of the nesting season for birds (April 15 to August 31) and general construction is anticipated to occur year-round. Nest sweeps will be conducted by a qualified professional prior to clearing activities, should vegetation removal be required within the nesting season.

Access Road Construction

Approximately 94 km of the existing road network will be re-used as part of the Project. Existing roads will require upgrades (widening, ditching, capping etc.). Approximately 129 km of new road construction is required to provide direct access to the turbines and connect areas within the Project. Access roads will have a 6 m to 12 m wide road surface and including ditching and grading will be 17 m to 20 m wide.

During construction, roads will be maintained with additional gravel or periodic grading. Aggregate material for road construction will be produced from borrow pits on the site or transported from local off-site quarries and stored temporarily until used. Any material removed for road construction will be stored or disposed of in accordance with regulations and best practices for road construction. Any material stored on the site will be managed with appropriate erosion and sedimentation control measures or re-used.

The following equipment is typically used during road upgrading and construction:

- Excavators
- Dump trucks
- Bull dozers
- Rollers
- Graders
- Crusher
- Light trucks

Turbine Pad Construction and Temporary Laydown Areas

Laydown areas and turbine pad construction may include:

- Installation of erosion and sedimentation control measures.
- Removal of vegetation and site grading.
- Removal of overburden and soils.
- Blasting/chipping of bedrock (to be determined, based on geotechnical conditions and foundation design).
- Pouring and curing of concrete pads (complete with reinforcing steel).
- Placement of competent soils to bring area to grade.
- Compaction of soils.
- Excavation for electrical conduits and fibre optic communication trenches.

The turbine tower foundations will be up to 30 m in diameter and extend to a depth of up to approximately 7 m below grade. Foundations will be backfilled (underground) with the exception of the concrete pedestal which will extend up to 1 m above ground to support the wind turbine tower structure.

Each turbine pad area is expected to be approximately 100 m by 100 m. The exact arrangement of each turbine pad and crane pad will be designed to suit the specific requirements of the turbine and the surrounding topography during the detailed design process.

Temporary laydown yards may be up to 12 ha, which includes clearing limits and any overburden. There are currently 18 temporary laydown areas under consideration.

Construction of a typical turbine pad (from clearing to final preparation for erecting of the turbine) can take between one to four months, depending on weather, soil, and construction vehicle availability/access. The following equipment may be used for the laydown areas and turbine pad construction:

- Excavators
- Dump trucks
- Bull dozers
- Rollers
- Graders
- Crusher (not required if a local quarry can supply gravel sizes)
- Concrete trucks and pumper trucks
- Light cranes
- Light trucks

Transportation of Turbine Components, Equipment, and Materials

The center of the Project is approximately 5 km northwest of Highway 316. The network of roads and trails throughout the Study Area provides optionality for detailed design.

Throughout the Study Area, the roads are accessible by truck/sport utility vehicles as well as other vehicles designed for rough dirt roads and tracks. The Study Area is frequented by both commercial users, primarily related to forestry activities, as well as recreational users year-round, including snowmobiling and ATV use, and hunting during the fall.

The transportation route to deliver turbine components to the Project is subject to the final turbine technology provider, who will undertake a comprehensive logistics study to determine the transportation route from the receiving and unloading port. Primary access routes during the operational lifespan of the Project are expected to be Eight Mile Lake Road, Loon Lake Road, Goldbrook Road, and New Harbour Lundy Road, and the existing network of smaller access roads.

The following permits and considerations are anticipated to be required for the transportation of tower components:

- Traffic Management Plan – Nova Scotia Public Works (NSPW)
 - Required to provide NSPW with a comprehensive overview of oversized and overweight component movements, including transport routes from port(s) to the Project and assessment of bridges and other load bearing structures on the transport routes, as required.
- Work Within Highway Right of Way Permit (NSPW).
 - Required if installing access to sites from the roadway, erecting structures within 100 m of the highway or removing access signs and guard rails.
- Over-Weight Moves Special Move Permit (Service Nova Scotia and Internal Services).
 - Required to transport oversized and overweight components. In some cases, due to the size and weight of the components, some may only be transported on Sundays.
- Provincial road weight restrictions will also need to be considered, especially spring weight restrictions, for heavier equipment and materials that will be transported to the Project.
- Access points will be designed with proper height and width to accommodate large trucks and will adhere to commercial stopping sight distances.

Different volumes and types of traffic will be generated throughout the Project's lifecycle. During the construction phase, trucks and other vehicles will be frequently visiting the area resulting in increased vehicular sound and air emissions (see Sections 7.1 and 7.3 for assessment and mitigation related to air quality and sound). During construction, most days will have 100 trucks per day, with a few days potentially requiring up to 200 trucks. Outside of the construction phase, the Project will only require technicians to access the site to perform regular maintenance/equipment checks. Provincial road weight restrictions will be considered, especially spring weight restrictions, for heavier equipment and materials that will be transported to the Project. Decommissioning will require a similar amount of traffic to the tower component delivery and construction.

The public road portion of the transportation route is expected to require road modifications to provide access to the Study Area. This is limited to modifications and upgrades to existing unpaved roads that exit from Highway 316 and the Larrys River Road to allow larger truck traffic to turn off the main road and to travel on the Project's gravel access roads.

The transportation route is expected to require road modifications, including the removal of signage and guardrails. Upgrades will also be made to roads and overhead wires, branches, and signs if conflicts arise. Bridges may be upgraded to increase allowable weight limits or temporary bridges built over existing bridges. Notices will be installed in public areas to inform residents of signage removal or road infrastructure alterations, as well as notify relevant municipal government staff of construction scheduling and safety measures.

The Proponent has committed to not restricting public access to roads and trails in the area with the exception of fencing surrounding the substation and temporary restrictions at active construction sites where restrictions are necessary due to safety considerations. In such circumstances, signs will be posted and physical barriers such as cones, candle sticks, t-posts and rope will be erected. In addition, transportation will avoid travel through urban areas, to the extent practicable, during high traffic times.

Turbine Assembly

The wind turbine assembly includes tower sections, the nacelle, the hub, and three-blade rotors. The tower sections will be erected in sequence on the turbine foundation, followed by the nacelle, hub, and blades. All sections will be delivered by specialized transportation equipment and the pieces will require a crane for removal from the vehicle at each of the prepared turbine pads or staging areas as required. Turbine erection will depend on weather, specifically wind and lighting conditions. Typical assembly duration per turbine is expected to be between two and five days, and turbine components will be delivered as turbines are being assembled and erected. The following equipment is expected to be used for turbine assembly:

- Main crane unit
- Assembly cranes
- Manufacturer's support vehicles

Construction and Connection of Power Collector System and Substation, and Transmission Lines

The Project turbines will generate power that will flow via its medium voltage collection circuit (that primarily follows the proposed roads) to one or more Project substations. Transmission line tie-ins will be constructed to connect the Project substation(s) to the Phase 2 high-voltage transmission line to be constructed, owned, and operated by EverWind (not included as a Project component within this document).

The following equipment is expected to be used:

- Excavators and/or back hoes
- Concrete trucks and pumper trucks

- Assembly cranes
- Bucket trucks
- Light cranes
- Light trucks

Removal of Temporary Works and Site Restoration

Once construction has been completed, all temporary works will be removed, and the site will be appropriately graded. The following equipment is expected to be used in this process:

- Excavator and/or backhoe
- Grader
- Hydroseeder
- Light trucks

Commissioning

The turbines will undergo a series of tests for mechanical, electrical, and operational controls prior to unit start-up sequence. Once the start-up sequence has been initiated, another series of performance checks for safety systems will be completed. When the turbines have cleared all tests, the commissioning of the units can begin.

Commissioning includes performance testing. These performance tests will be completed by qualified wind turbine technicians. Additional testing may also be required for transformers, power lines, and substation components; all of which will be performed by qualified engineers and technical personnel.

3.6.2 Operations

The lifespan of the Project is estimated to be a minimum of 35 years. During this time, roads will be used to access the turbines by staff and maintenance personnel. The roads will be maintained with additional gravel and grading, as required. During the winter months, roads may be plowed, sanded, and/or salted to the extent necessary to allow for safe access to project facilities for operations and maintenance.

A vegetation management plan will be initiated to ensure that access roads and turbine locations remain clear of vegetation. Timing of vegetation management will depend on site specific conditions and requirements by the Proponent and/or their operations and maintenance contractors. In addition to mechanical clearing (mowing, brush cutting, and trimming), selective and localized application of approved herbicides may be required to manage vegetation.

Due to the potential for public access to the wind farm, signage will be affixed and maintained on all access roads to provide essential safety information such as emergency contacts and telephone numbers, speed limits, and the hazards associated with being in close proximity to the turbines (i.e., ice throw). These signs will be maintained during the life of the Project. No gates to restrict access are proposed; however, fencing will be required around the substation

and temporary restrictions during active construction may be required, for the safety of the public.

Maintenance will conform to manufacturer equipment specifications, industry best management practices (BMPs), and standard operating procedures. Scheduled maintenance work will be carried out on a periodic basis. Maintenance work may require the use of a variety of cranes for brief periods of time for replacement of blades or other turbine repairs. The most common vehicle during maintenance work will be light/medium pickup trucks.

3.6.3 Decommissioning

Prior to decommissioning, Nova Scotia Environment and Climate Change (NSECC) and the Municipality of the District of Guysborough (MODG) will be provided with decommissioning plans for review and compliance with the Project's EA conditions. Opportunities for repowering will be considered prior to entering the decommissioning phase.

Generally, the decommissioning phase will follow the same steps as the construction phase:

- Dismantling and removal of the turbines.
- Decommissioning the turbine foundations as per the conditions of the land lease agreement (to approximately 1 m below surface grade).
- Removal, recycling (where practicable), and disposal of power collection system, conductor, and poles.
- Removal of all other equipment and reinstatement and stabilization of land.
- Access roads will either be removed or remain in place as per lease and easement agreements with the Crown and/or landowners.

According to the Canadian Renewable Energy Association (CanREA, n.d.), up to 90% of wind turbine blades can be recycled. Additional components, such as steel from the towers, copper cables, and electrical equipment, can also be recycled or reused. Materials that cannot be recycled can sometimes be reused in other applications, such as filler in construction materials. Recent innovations in fibreglass recycling have used various chemical and mechanical means to prepare the material for reuse in other applications (Power Technology, 2024). At the time of decommissioning, it is anticipated that newer technologies will allow for a greater amount of recycling or reuse of the end-of-life turbine materials. Any material that cannot be recycled or reused, will be sent for final disposal at an approval disposal facility.

Decommissioning is anticipated to take 18 to 36 months to complete.

Procedures for Dismantling

If the Project is to be decommissioned and the turbines are to be removed at the end of their service life or during construction, the procedures will be similar to the construction phase, but in reverse sequence. The general dismantling procedure will proceed as follows:

- The Project will first be de-energized and isolated from all external electrical lines.
- Temporary staging areas will be created to provide sufficient area for laydown of the disassembled wind turbine components and loading onto trucks. An area of approximately 1 ha around each wind turbine must be cleared, levelled and made accessible. After completion of the decommissioning, temporary staging areas and any associated temporary decommissioning facilities or components used throughout the decommissioning phase will be removed. The temporary staging areas will be located within the Assessment Area and used during the construction phase of the Project.
- Crane pads will be installed (estimated 30 m x 70 m) within the temporary staging area around each wind turbine. The topsoil at the crane pad will be removed and approximately 600 mm of compacted crushed gravel will be added. Once the turbine disassembly has been completed, the gravel area around each turbine will be removed and the area will be restored to prior use using stockpiled topsoil.
- Wind turbines (blades, hub, nacelle, and tower segments) will be removed using cranes. The components and associated equipment will be hauled off using trucks and heavy-loaders, and components will be recycled, where practicable, or disposed of off-site at an approved and appropriate facility.
- The top of the concrete foundations will be removed to approximately 1 m below the surface at that time. Excavated foundation areas will be backfilled with clean fill and stockpiled topsoil to match the original elevations. These areas will also be graded, contoured, and restored to a land use similar to what was present prior to foundation installation to allow for prior activities to resume.
- Overhead electrical lines are expected to be removed at the end of the Project's life. Poles will be cut to a depth of approximately 1 m below original grade or may be completely removed from the ground, where feasible.
- The substation(s) and associated infrastructure will be dismantled and removed in accordance with the legal requirements at the time. Any concrete foundations associated with these facilities will be removed to at least 1 m below the original grade. The area will be graded, contoured, and restored to land use similar to what was present prior to foundation installation to allow for prior activities to resume. All materials will be recycled, where practicable, or disposed of off-site at an approved and appropriate facility.
- Removal of access roads will depend on the requirements and agreements in accordance with the Crown and/or landowner.
- The MET towers will be removed unless otherwise requested by the municipality or stakeholders (and agreed to by the Proponent and the Crown/landowner) to remain in

place. Any concrete foundation would be removed to at least 1 m below original grade or to the depth originally installed if less than 1 m below original grade. The area will be graded, contoured, and restored to land use similar to what was present prior to foundation installation to allow for prior activities to resume.

Restoration of Land

After the decommissioning process has been completed, the land will be left to naturally revegetate.

Waste Generated

Waste and debris generated during the decommissioning activities will be collected and disposed of at an approved facility. All reasonable efforts will be made to minimize waste generated throughout the decommissioning phase. Materials used and generated throughout decommissioning will be recycled, as practicable.

Industry best practices for spill prevention will be employed. In the unlikely event of a minor spill, it will be cleaned up immediately and any impacted soils will be removed from the site and disposed of at an appropriate facility in accordance with the applicable regulations.

After decommissioning, vehicles and construction equipment will be removed from the site.

3.7 Project Schedule

Table 3.4 presents the Project schedule from EA registration to Project decommissioning.

Table 3.4: Project Schedule

Project Activity	Timeline
EA Registration	May 2026
Post-EA Environmental Monitoring Programs	Prior to appropriate project phase
Geotechnical Assessment	2027 to 2029
Detailed Engineering Design	2027 to 2029
Municipal Decision on Development Agreement	2029
Clearing	2029 to 2030
Construction	2030 to 2034
Commissioning	2034
Operation	+35 years
Decommissioning	1.5 to 3 years post-operation

4.0 ENVIRONMENTAL ASSESSMENT METHODOLOGY

As a Class 1 EA, this Registration Document and supporting studies have been developed to meet all requirements under Section 9(1A) of the Environmental Assessment Regulations, N.S. Reg. 93/2025. As such, this submission has been prepared in accordance with:

- A Proponent's Guide to Environmental Assessment (NSECC, 2025a)
- Nova Scotia Class I Environmental Assessment Checklist (NSECC, 2025e)
- Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a)

Over the past several years, Project team members have engaged with the following regulatory bodies to provide input and advice into the EA scope and planning for the proposed Project, as well as for several other similar proposed wind project developments in Nova Scotia:

- Environment and Climate Change Canada – Canadian Wildlife Service (ECCC-CWS)
- Nova Scotia Communities, Culture, Tourism, and Heritage (NSCCTH)
- NSECC
- Nova Scotia Natural Resources (NSNR)
- Nova Scotia Office of L'nú Affairs (OLA)

4.1 Assessment Scope & Approach

EA is a planning tool used to predict the environmental effects of a proposed project, identify measures to mitigate adverse environmental effects, and predict the significance of any effects after the application of mitigation measures.

The EA focuses on VCs. VCs are specific components of the biophysical and human environments that, if altered by the Project, may be of concern to the Mi'kmaq of Nova Scotia, regulators, stakeholders, and/or the public. The scope of the EA for this Project includes:

- Identify VCs that the Project may interact with (by activity and phase) within established spatial and temporal boundaries.
- Establish the existing conditions for VCs.
- Identify potential interactions between the Project and the VCs.
- Assess the potential effects that could occur from the interaction.
- Identify mitigation measures to reduce or eliminate those effects.
- Evaluate the significance of the environmental effects after the implementation of mitigation measures using VC-specific criteria.
- Identify monitoring or follow-up programs to verify predictions and/or evaluate the need to implement adaptive management.

4.1.1 Identification of Valued Components

The following VCs were identified based on the experience of the Project Team and through engagement with the Mi'kmaq of Nova Scotia, regulators, stakeholders and the public:

- Atmospheric environment
 - Weather, climate, air quality
 - GHGs
 - Sound
 - Shadow flicker
- Geophysical environment
 - Geology, hydrogeology/groundwater
- Aquatic environment
 - Surface water, fish and fish habitat
 - Wetlands
- Terrestrial environment
 - Terrestrial vegetation communities and flora
 - Fauna (including mainland moose)
 - Bats
 - Avifauna
- Socioeconomic environment
 - Economy
 - Land use
- Archaeological resources

4.1.2 Spatial & Temporal Boundaries

4.1.2.1 Spatial Boundaries

Spatial boundaries are considered separately for each VC and are typically based on natural system boundaries or administrative/political boundaries, as appropriate. The following spatial boundaries have been established for the effects assessment:

- Local Assessment Area (LAA): The area which represents the maximum extent of predicted or measurable direct and/or indirect effects of the Project. The LAA is VC-specific and defined in each VC chapter.
- Regional Assessment Area (RAA): The area that encompasses all Project-related effects including diffuse or long-range effects. The RAA provides a broader context for assessing Project-specific effects. This area may be used to support the assessment of cumulative effects, accidents and malfunctions, and elsewhere as appropriate. The RAA varies between VCs and will be defined (where necessary) in each VC chapter.

Additional boundaries were also identified for the purpose of field data collection and to describe the area containing Project infrastructure, as provided in Section 3.2.

4.1.2.2 Temporal Boundaries

The temporal boundaries in Table 4.1 apply to all VCs unless otherwise stated in the individual chapters.

Table 4.1: Temporal Boundaries

Project Phase	Temporal Boundary
Site Preparation and Construction	5 years
Operation and Maintenance	35 years
Decommissioning	+35 years (18 to 36 months in duration)

4.1.3 Species at Risk

In evaluating the potential effects of the Project on wild species, special consideration is given to SAR, which include those species listed under the *Species at Risk Act* (SARA) (Canada, 2002) and/or the *Endangered Species Act* (ESA) (Nova Scotia, 1998). Consideration is also given to species of conservation interest (SOCI), which, for the EA Registration Document, includes species that are:

- Assessed as Endangered, Threatened, or Special Concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) that are not already listed under SARA.
- Have a subnational rank (S-Rank) of S3, S2, or S1 (or a combination thereof) from the Atlantic Canada Conservation Data Centre (ACCDC).

SAR and SOCI species and their supporting habitat are identified in individual VC chapters, as appropriate.

4.1.4 Biophysical Assessment Components and Timing

The biophysical field components of the EA were initiated in Winter 2023 and continued until December 2024. The field components, survey timing, and surveyors that completed the assessments are outlined in Table 4.2.

Table 4.2: Biophysical Assessment Components, Timing, and Surveyors

Survey		Date	Surveyor(s)
Vegetation Community and Classification (i.e., habitat)		Throughout vascular plant, lichen, winter moose, pellet group and old growth surveys	Strum botanists and biologists
Vascular Plant Surveys	Rare Plant Surveys	July 2023 and 2024.	Strum botanists
Lichen Survey		July 2023 and May to December 2024	Strum lichenologist
Old-Growth Forest Surveys		Fall 2023 to Spring 2024	Strum biologists
Wildlife Surveys	Incidental Observations	Opportunistically throughout all biophysical surveys	All surveyors
	Wood Turtles	May 2023	Strum biologists

Survey		Date	Surveyor(s)
	Bat Acoustic Monitoring	Fall 2023 and spring 2024	Strum
	Winter Moose surveys	January to March 2024	Strum biologists
	Trail Camera Assessment	March 2023 to May 2024	Strum
	Spring Pellet Group Inventory Surveys	April and May 2024	Strum biologists
Avian Surveys	Spring Migration (3)	April 1 to May 31, 2023	Chris Pepper (sub-contractor)
	Breeding Bird (2)	June 1 to July 15, 2023	
	Nightjar (2)	June 2023	
	Fall Migration (3)	August 15 to November 15, 2023	
	Acoustic & Radar Monitoring	April to November 2023	Strum
Wetland and Watercourse Surveys		June 2023, June to November 2024.	Strum biologists
Fish and Fish Habitat Surveys		July 2023	
SAR	Incidental Observations	All seasons	All surveyors

As the Project has continuously undergone design changes and refining, some portions of the Assessment Area have not yet been field-assessed. Areas to be assessed during future surveys are primarily related to shifts in turbine and road placement to avoid sensitive features identified through field assessments (Drawing 4.1). Table 4.3 provides a breakdown of the area remaining to be assessed.

Table 4.3: Assessed Areas

Area of Study	Area (ha)	Percentage (%)
Assessment Area (total)	2,534	-
Assessed as part of this EA	2,293	91
Remaining to be assessed	241	9

The Proponent commits to the completion of assessments in the remaining areas prior to the commencement of construction activities in those areas.

4.1.5 Approach to Receptors

Turbine setbacks have been applied to all residential dwellings as defined in the Minimum Planning Requirements Regulations, N.S. Reg. 51/2025 (MPRR), which was created to harmonize turbine setback requirements across Nova Scotia and promote wind development.

The MPRR limits municipal planning setbacks between residential dwellings and wind turbines to a **maximum** of:

- a) Four times the wind turbine height.
- b) The distance required to ensure that:
 - i. Sound levels from the wind turbine do not exceed 40 A-weighted decibels (dBA) at the exterior of a residential dwelling.
 - ii. A residential dwelling receives less than 30 minutes per day or 30 hours per year of shadow flicker.

and whereas “residential dwelling” means a permanent structure used for human habitation and includes a house, condominium, apartment building, cottage, mobile home, or trailer.

The Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d) requires:

- a) Modeling to show that operational noise at permanent and seasonal receptors (within 2 km) will not exceed 40 dBA.
- b) Modelling to show that shadow flicker will not exceed 30 minutes per day or 30 hours per year at any permanent or seasonal receptor within 2 km of the project.

To avoid conflict between the MPRR and the Environmental Assessment Supplemental Checklist: Wind Energy Projects, the Proponent has equated “permanent receptors” to “house, condominium, apartment buildings, mobile home, or trailer” and “seasonal receptors” to “cottage”. The Proponent has specifically excluded “camps” as “seasonal receptors” as this would conflict with the MPRR.

As required by the NSECC, all potential receptors within a 2 km radius of any wind turbine are included in the sound and shadow flicker studies. Consistent with the MRPP, compliance with sound and shadow thresholds are only considered a requirement for confirmed residential dwellings. Potential receptors were identified through a desktop review of Nova Scotia’s public “building” GIS layer, civic address database, and additional visual inspection of aerial imagery.

4.2 Potential Project-Valued Component Interactions

The potential interactions between the Project and the VCs, by phase, are presented in the individual VC chapters (Sections 7 to 12), following a description of existing conditions. Where an adverse effect on a VC is identified, strategies for avoidance, mitigation, or compensation are proposed. Where practicable, mitigation measures are incorporated into Project design to eliminate or reduce potential adverse effects.

4.3 Effects Assessment Criteria

The significance of the effects after mitigation is determined using defined criteria. Most criteria will be the same for all VCs (Table 4.4); however, the magnitude criteria are VC-specific and are provided in the individual chapters.

Table 4.4: Effects Assessment Criteria

Rating Criteria	Rating
Magnitude The amount of change in measurable parameters or the VC relative to existing conditions	VC-specific as outlined in individual chapters.
Geographic Extent⁽¹⁾ The geographic area in which an effect occurs	LAA – the area where direct and/or indirect Project-related effects can be predicted or measured for assessment unless impacts are widespread. RAA – The area providing broader context for assessing Project-specific effects (if/where applicable).
Frequency Identifies how often the residual effect occurs and how often in a specific phase	Single event – occurs once Intermittent – occurs occasionally or intermittently during one or more phase of the Project Continuous – occurs continuously
Duration The time required until the measurable parameter or VC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	Short Term: Residual effect restricted to no more than the duration of the construction phase and/or decommissioning phase. Medium Term: Residual effect extends through the operation, maintenance, and ends before, during, or shortly after the decommissioning phase. Long Term: Residual effect extends throughout the Project's lifecycle and beyond the decommissioning phase.
Reversibility Describes whether a measurable parameter or the VC can return to its existing condition after the activity ceases	Reversible – the residual effect is likely to be reversed after the activity is completed Irreversible – the residual effect is unlikely to be reversed Partially Reversible – the residual effect is likely to be partially reversible after the activity is completed.

⁽¹⁾ Criteria used for describing context of the effect; however, do not factor directly into the significance definition.

If, based on the criteria in Table 4.4, a residual effect is identified, its significance is then evaluated based on the criteria in Table 4.5.

Table 4.5: Definition of Significant Residual Environmental Effect

Magnitude	Duration	Frequency	Reversibility	Significance
Negligible	All	All	All	Not significant
Low	All	All	All	Not significant
Moderate	Short term Medium term	Single event Intermittent	Reversible Partially reversible	Not Significant
	Long Term	Continuous	Irreversible	Significant
High	Short term Medium term	Single event Intermittent	Reversible Partially Reversible	Not significant
	Medium term Long term	All	Irreversible	Significant

4.4 Monitoring & Follow-Up

Follow-up programs and monitoring, in some cases developed in conjunction with regulators, may be recommended to verify predictions and/or assess effectiveness of mitigation measures and the need to implement adaptive management. Follow-up programs and monitoring are presented, as necessary, in individual VC chapters.

5.0 MI'KMAQ OF NOVA SCOTIA

The Mi'kmaq are the founding people of Nova Scotia and currently live throughout the province, including 13 Mi'kmaq communities (OLA, 2015). The Project is located within the Mi'kmaq territory called Eskikewa'kik, which means "skindresser's territory" (MDCC, 2025b).

The Mi'kmaq in the provinces of Nova Scotia, New Brunswick, and Prince Edward Island, and the Gaspé Peninsula in Quebec, are founded on land historically occupied by the ancestors of the Mi'kmaq. The earliest evidence of the Mi'kmaq of Nova Scotia in the Maritimes Region indicates that the ancestors of the Mi'kmaq have existed on the land for more than 11,000 years (MDCC, 2025a).

The Mi'kmaq of Nova Scotia have established Aboriginal and Treaty rights, including the right to fish for a "moderate livelihood" which flows from the Peace and Friendship Treaties, and Aboriginal rights to hunt, fish, and gather for food, social, and ceremonial purposes, more broadly referred to as "traditional" purposes. Mi'kmaq rights are communal rights and therefore shared amongst all members of the Mi'kmaq Nation in Nova Scotia.

The Crown has a duty to consult with the Mi'kmaq of Nova Scotia, which is achieved in accordance with the Mi'kmaq-Canada-Nova Scotia Consultation Terms of Reference. As per Supreme Court of Canada instruction and subsequent guidance from governments, [such as the Updated Guidelines for Federal Officials to Fulfill the Duty to Consult (INAC, 2011) and the Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia (OLA, 2012)], the Crown may delegate procedural aspects of consultation to proponents. However, the duty to consult, and ultimate decision-making authority, remains with the Crown. The results of the Proponent's Mi'kmaq of Nova Scotia engagement program and EA development is expected to be considered by the provincial government in the EA decision-making process.

For the purposes of consultation, 10 of the 13 Mi'kmaq communities are represented by the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO), which reports to the Assembly of Nova Scotia Mi'kmaq Chiefs. At this time, Membertou First Nation, Millbrook First Nation and Sipekne'katik First Nation represent their own communities in consultation through their elected Chiefs and Councils.

Additionally, the Nova Scotia Native Council (NSNC) is the self-governing authority that represents Mi'kmaq and Aboriginal people living off reserve in Nova Scotia throughout traditional Mi'kmaq territory.

The nearest Mi'kmaq community to the Project is the Paq'tnkek Mi'kmaw Nation community on the Paq'tnkek-Niktuek Reserve (No. 23) with a population of 614 individuals (2023, Paq'tnkek). Paq'tnkek is located approximately 42 km northwest of the Project. Other, further communities include Potlotek First Nation on the Chapel Island (No. 5) Reserve (population 405; 75 km northeast), and the We'koqma'q First Nation on the Whycocomagh Reserve (No. 2) (population 877; 85 km north).

The nearest known Mi'kmaq placenames to the Project are Anakwe'katik which means "at the flounder place", Aqu'pukuik which means "it stands out of sight", and Pkue'katik which means "at the spruce gum place" (T'an Weji-sqalia'tiek, n.d.). These placenames correspond to the areas of Country Harbour and Isaac Harbour, New Harbour, and Larrys River along Highway 316.

5.1 Engagement

As an integral component of any project development activity in Nova Scotia, the Proponent prioritized engagement with Nova Scotia Mi'kmaq communities and organizations.

The Proponent initiated engagement with OLA in May 2024 and followed up with additional Project information in October 2024 and March 2026.

The Proponent notified the Mi'kmaq of Nova Scotia of the Project, extended an offer to meet, provided Project information, met with the KMKNO, completed a Mi'kmaq Ecological Knowledge Study (MEKS) with Membertou Geomatics, and documented the engagement process (Table 5.1) per steps one through six of the Proponents' Guide: The Role of Proponents in Crown Consultation with the Mi'kmaq of Nova Scotia (OLA, 2012).

On June 6, 2024, Project introduction letters, which included an offer to meet, were sent to the 13 Mi'kmaq of Nova Scotia communities. Additionally, on March 24, 2026, Project overview letters, which included an offer to meet were provided via email to Potlotek First Nation, Paq'tnkek First Nation, Pictou Landing First Nation, Sipekne'katik First Nation, and Millbrook First Nation. This letter was also provided to the KMKNO.

The Proponent met with the Sipekne'katik Governance Initiative (SGI) on February 19, 2026, to discuss the Upper Afton Wind Project. An overview of EverWind's Phase 2 portfolio of projects, including the Ocean Lake Wind Project, as they relate to the SGI process, was also provided.

Table 5.1: Engagement with the Mi'kmaq of Nova Scotia

First Nation / Organization	Representative(s)	Communication Details
First Nations		
Eskasoni First Nation	Chief Leroy Denny Michael Denny Steve Parsons	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet. July 3, 2025 – email sent providing Project description, map, and offer to meet.
L'sitkuk First Nation	Chief Carol Dee Potter	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet.
Membertou First Nation	Chief Terrance Paul	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet. July 3, 2025 – email sent providing Project description, map, and offer to meet. Since 2022, EverWind has regularly engaged with Membertou First Nation in their role as an equity partner in development of Phase 1 and 2 wind projects.
Millbrook First Nation	Chief Robert Gloade Claire Marshall Gerald Gloade	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet. Ms. Marshall responded with a question regarding capacity funding for consultation. EverWind requested a meeting to discuss the portfolio of projects. July 3, 2025 – email sent providing Project description, map, and offer to meet. March 24, 2026 – email sent providing Project update, description, map and offer to meet.

First Nation / Organization	Representative(s)	Communication Details
Paq'tnkek First Nation	Chief Cory Julian	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet. July 3, 2025 – email sent providing Project description, map, and offer to meet. January 20, 2026 – community information session held at the Paq'tnkek Community Centre to discuss the Upper Afton Project as well as other Projects. Community members attended. January 26, 2026 – email sent to Chief offering a detailed Project update. February 18, 2026 – representative visited band office to leave contact information regarding Project. March 24, 2026 – email sent providing Project update, description, map and offer to meet.
Pictou Landing First Nation	Chief Tamara Young	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet. July 3, 2025 – email sent providing Project description, map, and offer to meet. March 24, 2026 – email sent providing Project update, description, map and offer to meet.
Potlotek First Nation	Chief Wilbert Marshall	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet. May 8, 2025 – EverWind attended Potlotek Career Fair. July 3, 2025 – email sent providing Project description, map, and offer to meet. March 24, 2026 – email sent providing Project update, description, map and offer to meet.

First Nation / Organization	Representative(s)	Communication Details
Sipekne'katik First Nation and Sipekne'katik Governance Initiative	Chief Michelle Glasgow Council Dr. Rodger Lewis Marine Courtois Maya Chouinard	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet. February 27, 2025 – Meeting held with SGI to discuss the portfolio of EverWind projects (focus on Strait Crossing Transmission Line). Project update to Chief and Council was scheduled for June 19, 2025, and July 3, 2025; however, both updates were cancelled by Council due to unforeseen circumstances. Meeting to be rescheduled. November 4, 2025 – Attended Sipekne'katik First Nation council meeting and directed by Chief to follow SGI process, noting that this meeting was not consultation. Met with SGI team to understand history, process and next steps. February 19, 2026: Follow up meeting held with SGI to discuss Phase 2 consultation with Sipekne'katik through the SGI process. Updated SGI on progress of the Project and upcoming EA.
Wagmatcook First Nation	Chief Norman Bernard Donald Hanson	June 6, 2024 – email sent providing Project description, map, and offer to meet. January 23, 2025 – email sent providing Project description, map, and offer to meet.
We'koqma'q First Nation	Chief John Leonard Bernard	January 23, 2025 – email sent providing Project description, map, and offer to meet. July 3, 2025 – email sent providing Project description, map, and offer to meet.
Annapolis Valley First Nation	Gerald B. Toney	June 6, 2024 – email sent providing Project description, map, and offer to meet.
Acadia First Nation	Deborah Robinson	June 6, 2024 – email sent providing Project description, map, and offer to meet.
Glooscap First Nation	Chief Sidney Peters	June 6, 2024 – email sent providing Project description, map, and offer to meet.
Organizations		
Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO)	Patrick Butler Twila Gaudet	KMKNO was copied by EverWind on all emails to respective Mi'kmaq of Nova Scotia communities (see above).

First Nation / Organization	Representative(s)	Communication Details
		Virtual meeting held on February 4, 2024 – presentation provided to KMKNO (Project overview). September 10, 2025 – email sent offering the opportunity to meet for Project update. March 24, 2026 – email sent providing Project update, description, map and offer to meet. April 16, 2026 – EverWind requested a meeting via email to discuss the Phase 2 portfolio of projects.
Maritime Aboriginal Peoples Council	Christina Davis Vanessa Mitchell	April 16, 2026 – email providing Project update sent and offer to meet extended. April 30, 2026 – EverWind provided an overview of the Project and discussed feedback from the Upper Afton Wind Project, noted commitment to follow up during the 40 day public comment period for the Project's EA registration. EverWind also responded to questions regarding Project scale, potential effects on bats and birds, SAR setbacks, and mainland moose.
The Native Council of Nova Scotia	Chief Lorraine Augustine	March 21, 2025 – email providing Project update sent and offer to meet extended.
Nova Scotia Mi'kmaq Summer Games	Chief Norman Bernard Samantha Young	July 3, 2025 – email providing Project information sent. August 22 and 23, 2025 – Information booth at the Nova Scotia Mi'kmaq Summer Games in Wagmatcook with staff on-site discussing the Project.
Mukk Nqa'ltultik Community Connections Symposium	Tracy Menge Noelle MacLean	May 22, 2025 – The Proponent presented at a conference in Truro to discuss the Project and potential career and procurement opportunities.
Mi'kmaq Advisor	Proponent Contractor	The Proponent has engaged a Mi'kmaq advisor for ongoing engagement throughout 2025 and up to the time of EA registration, including multiple site tours. Discussion focused on potential considerations for Project development on Crown land, including land stewardship, Indigenous participation, and long-term monitoring. Additional topics included community wellbeing considerations related to workforce presence and accommodation, as well as potential effects on water resources, traditional land use, traditional medicines, and food security. Environmental considerations such as SAR, old growth forest, and ecological stewardship were also discussed.

5.1.1 Review of Concerns

Issues and concerns raised by the Mi'kmaq of Nova Scotia have been grouped into broader categories and reference to the relevant section of the EA in which the concern is addressed is noted (Table 5.2).

Table 5.2: Concerns from the Mi'kmaq of Nova Scotia

Key Issues	Proponent Response	Section of EA
Socioeconomic Impacts		
What are the employment opportunities for the Mi'kmaq of Nova Scotia?	The Proponent is committed to providing opportunities for Mi'kmaq participation in the Project, including employment, training, and contracting opportunities, where feasible. Engagement with Mi'kmaq communities will continue to identify areas of interest and capacity throughout Project planning and development. The Proponent continues to advance a Mi'kmaw Benefits Agreement with the Assembly of Mi'kmaq Chiefs that build upon the MOU signed in 2023 and the Memorandum of Agreement in 2025.	Sections 5.1.2 5.3 5.4
Environmental Impacts		
How will the Project impact Crown land?	The Project is primarily sited on Crown land and is being advanced in accordance with applicable provincial policies and approvals. The Proponent has entered into a MOU with NSNR for the use of Crown lands. The Proponent recognizes the importance of Crown lands to the Mi'kmaq of Nova Scotia and is committed to ongoing engagement to understand and consider interests related to land use, access, and stewardship. Project design has sought to minimize disturbance to the extent practicable while maintaining compatibility with existing uses. No permanent restrictions to public access are proposed, with the exception of fencing around substations and temporary access limitations during construction to ensure public safety.	Sections 3.3 11.2
Will there be impacts on old growth?	Project design has prioritized the avoidance of sensitive environmental features, including old growth forest, where identified. Where avoidance is not feasible, potential effects are expected to be localized and will be minimized through standard mitigation measures and further refined during detailed design and permitting.	Section 10.1

Key Issues	Proponent Response	Section of EA
How will this Project impact birds and bats?	A full desktop review and extensive field surveys, including radar and acoustic monitoring, have been completed to identify the presence, abundance, and movement patterns of birds and bats as well as their habitat across the Study Area. The results of these assessments are used to inform Project design, including turbine siting and layout, to avoid or minimize potential impacts where possible. In addition, mitigation measures will be implemented. Post-construction monitoring will also be carried out to assess actual effects on birds and bats. If monitoring identifies higher-than-expected impacts, adaptive management measures will be implemented in consultation with NSECC, NSNR, and ECCC. The Proponent has also committed to the development and implementation of a Terrestrial Habitat and Wildlife Management Plan.	Sections 10.3 10.4
What are the impacts on Species at Risk?	Potential effects on SAR have been assessed based on available data and field studies. Mitigation measures, including avoidance, timing restrictions, and habitat protection, will be implemented to reduce potential impacts. The Proponent will also develop and implement a Terrestrial Habitat and Wildlife Management Plan. Additional requirements, if any, will be addressed through applicable permitting and follow-up programs.	Sections 9.1 10.1 10.2 10.3 10.4
Will the project result in Impacts to water quality?	Where Project infrastructure intersects with watercourses, all crossings will be designed and constructed in accordance with applicable regulatory requirements and will be subject to the necessary authorizations from relevant authorities, including NSECC and DFO, where applicable. Construction activities near watercourses will be carefully managed to reduce potential effects on fish habitat. This includes timing work to avoid sensitive fish spawning and migration periods (known as in-water work timing windows) and implementing best management practices to prevent sediment release.	Sections 8.0 9.1

Key Issues	Proponent Response	Section of EA
	A Surface Water Management Plan and an Erosion and Sediment Control Plan will be developed and implemented for the Project. If blasting is required for construction, groundwater wells within 800 m will undergo an assessment in accordance with NSECC's Procedures for Conducting a Pre-blast Survey (NSECC, 1993). If demonstrable changes in groundwater quantity or quality to a well are detected due to Project activities, an alternative water supply, of equal or better quantity/quality than that impacted will be provided to the landowner.	
General		
What is the plan for workers accommodations?	Workforce accommodation needs will be managed in a manner that considers local community capacity and minimizes potential disruptions. The Proponent is exploring options for shared or dedicated accommodations in coordination with other industrial users in the region, where feasible, to manage pressure on local housing. Measures such as managed transportation to and from worksites, workforce codes of conduct, and worker onboarding that includes awareness of community context will be implemented to support respectful interactions. The Proponent is committed to ongoing engagement with relevant organizations and communities, including specific measures for the safety of Mi'kmaq women, to inform a responsible approach to workforce accommodation and management.	Section 3.5.5
How is the Project considering impacts on women?	The Project will be developed with consideration of community wellbeing, including potential impacts on women and vulnerable populations. Measures such as workforce codes of conduct, employee screening and background checks, awareness of local context, and alignment with relevant guidance and best practices will be incorporated into Project planning and implementation. The Proponent is committed to engaging with relevant organizations and communities.	N/A

5.1.2 Ongoing Engagement

The Proponent is committed to on-going, meaningful engagement and economic reconciliation with the Mi'kmaq of Nova Scotia and will continue to provide regular updates and seek feedback throughout the life of the Project. Additionally, the Proponent is developing a Mi'kmaq Benefits Agreement (MBA) with the Assembly of First Nations and KMKNO. A MOU was

signed with the Assembly in 2022, and a binding Memorandum of Agreement was signed in 2025. A draft Umbrella Agreement encompassing all Projects is currently being developed and a Mi'kmaq Benefits Working Group has been stood up in March 2026. The Proponent will continue to engage with KMKNO and the SGI specifically.

The Proponent is also committed to minimizing footprint disturbance and impacts to the Mi'kmaq of Nova Scotia while generating positive economic and environmental benefits. The Proponent will develop a Mi'kmaq Communication Plan that outlines an ongoing two-way communication process throughout the life of the Project.

5.2 MEKS

A Mi'kmaq Ecological Knowledge Study (MEKS) presents a thorough and accurate understanding of the Mi'kmaq of Nova Scotia's use of the land and resources within an area. It is a report of gathered, identified, and documented ecological knowledge which is held by individual Mi'kmaq people. In addition, the MEKS report provides information on proposed Project activities that may impact the traditional land and resources of the Mi'kmaq. The MEKS for this Project was developed by Membertou Geomatics Solutions and was geographically scoped to include an evaluation of the Project Site (the "Study Area" as defined throughout the rest of this document) along with a 5 km buffer surrounding the Project Site (referred to as the "Study Area" in the MEKS report).

MEKS considers the land and water areas in which the proposed Project is located to identify what Mi'kmaq traditional use activities have occurred or are currently occurring within the "Study Area"; and what Mi'kmaq ecological knowledge presently exists with respect to the area. This process is done in accordance with the Mi'kmaq Ecological Knowledge Protocol, 2nd Edition ("Protocol"), which was established by the Assembly of Nova Scotia Mi'kmaq Chiefs and speaks to the process, procedures, and results that are expected of a MEKS. Per the Protocol, a copy of the MEKS has been provided to KMKNO for review. All MEKS' must be reviewed by KMKNO on behalf of the Assembly to ensure consistency with the Protocol. KMKNO will review the MEKS and advise if the requirements have been met, or if the MEKS must be amended. When this review is completed by KMKNO, a copy of the MEKS will be provided directly to the required reviewers under separate cover.

The MEKS consists of two major components:

- **Mi'kmaq Traditional Land and Resource Use Activities**
 - Considers both past and present uses of the area.
 - Uses interviews as the key source of information regarding Mi'kmaq use.
- **A Mi'kmaq Significance Species Analysis**
 - Identifies species in the area and considers resources that are important to Mi'kmaq use (food/sustenance resources, medicinal/ceremonial plant resources, and art/tools resources).
 - Considers resource availability/abundance in the area (along with adjacent

areas or in other areas outside), their use, and their importance, with regards to the Mi'kmaq.

Interviews were undertaken by the MEKS Team with Mi'kmaq knowledge holders from the communities nearest the Project and beyond. The interviews took place between September 2025 and March 2026. A summary of the MEKS findings is provided below.

Traditional Use in the Study Area

- There is current, recent and historic Mi'kmaq use within the Study Area.
- Deer, partridge, and rabbit hunting were reported with the highest frequency of current use in the Study Area.

Traditional Use in the Project Site

- There is current, recent and historic Mi'kmaq use within the Project Site.
- Deer and rabbit hunting were reported with the highest frequency of current use in the Study Area.

Historic Review

- There are very few known archaeological finds/sites within the vicinity of the Study Area, and none within the Project Site.
- A review of Specific Claims shows no current and active First Nation Claims within the Project Study Area.

No recommendations were provided in the MEKS report.

5.3 Mi'kmaq Partnerships

Membertou Development Corporation is leading a Mi'kmaq Nations consortium with equity ownership in both Phase 1 and 2 wind projects, including the Ocean Lake Wind Project. The Proponent is committed to partnering with Mi'kmaq communities for all projects.

5.4 Commitments to the Mi'kmaq of Nova Scotia

The Proponent is committed to the following mitigation measures to reduce the Project's impact on traditional practices and Mi'kmaq archaeological features (if identified), as follows:

- Provide the Mi'kmaq of Nova Scotia an opportunity to walk the site prior to clearing to document sensitive sites and harvest traditional plants.
- Halt work during construction if archaeological deposits or human remains are encountered. The Proponent will immediately contact NSCCTH, the KMKNO Archaeological Division, and SGI.
- Provide a tour of the Project to the Mi'kmaq of Nova Scotia, once constructed.
- Develop a Mi'kmaq Communication Plan.
- Develop a Complaint Resolution Plan.
- Continue to work with the Assembly of First Nations to develop a MBA that will enable the Mi'kmaq of Nova Scotia to actively participate in the Project through education, training, mentorship, employment, and procurement opportunities.

- Continue to engage with the Mi'kmaq of Nova Scotia for the life of the Project.
- Include the Project as a component of the MBA which includes training, education, mentoring, employment and procurement opportunities for the Mi'kmaq of Nova Scotia implemented through the Assembly of Nova Scotia.

6.0 ENGAGEMENT

The Proponent is committed to meaningful engagement with government, the public, stakeholders, and the Mi'kmaq of Nova Scotia. To date, the Project Team has participated in meetings, delivered presentations, and hosted several open house sessions.

Associated presentations, posters, and meeting agendas/minutes are provided in Appendix B.

Engagement related to EMI is described in Section 6.3.

6.1 Engagement with Government Departments, Agencies and Regulators

6.1.1 Regulatory Engagement

The Project Team has met with government entities and officials representing federal, provincial, and municipal jurisdictions (Table 6.1) to open lines of communication about the Project and ensure all regulatory requirements are met.

Table 6.1: Government Meetings and Events

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Federal Government		
Transport Canada (TC)	Jason Flanagan Carl Ripley Allison Baker	November 19, 2024 – Presentation to TC providing an overview of EverWind's portfolio of Projects, including the Ocean Lake Wind Project (main focus of discussion was the Strait Crossing Transmission Line).
	Jason Flanagan Cindy Poirier Gabby Aseneault Melanie Leblanc	July 2, 2025 – Presentation to TC providing an overview of EverWind's portfolio of Projects, including the Ocean Lake Wind Project (main focus of discussion was Strait Crossing Transmission Line permitting).
Minister, Member of Parliament (MP), and Federal Atlantic Canada Opportunities Agency staff	Gudie Hutchings Mike Kelloway Neil MacIsaac Kevin Lemkay Connor Poirier Chuck Maillet Joe Cashin	February 11, 2025 – Site tour of the Facility and briefing on the Project.
Member of Parliament (MP)	Jaime Battiste	June 25, 2025 – MP delivered opening remarks for EverWind-organized intergovernmental planning session held at Friends United. January 12, 2026 – MP invited via email to open houses and offered Project update meeting.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Natural Resources Canada and Sustainable Jobs Partnership Council	Adam Hedayat (Council) Kaella-Marie Earle (Council) Lionel Railton (Council) Caroline Brouillette (Council) Paran Meysami (Council) Cori Anderson (NRCAN) Roan Corbett (NRCAN)	March 26, 2026 – Conducted a site tour of the Facility with a detailed Project update.
Provincial Government		
NSECC – EA Branch	EA Branch Staff	May 12, 2023 – Provided an update on the Project status, studies in progress, and timing of submission. June 8, 2023 – Reviewed methodology for baseline wetland data collection. October 11, 2023 – Provided an update on the Project status, studies in progress/completed, and timing of submission. January 25, 2024 – Provided an update on the Project status, studies in progress/completed, and timing of submission. July 7, 2024 – Meeting to provide Project updates, overview, and proposed EA registration timing. June 11, 2024 – Meeting held with the EA Branch to discuss wind project development and refinement throughout and after the EA process.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		November 18, 2025 – Provided an update on EA registration timing. March 20, 2026 – Project update memo provided that included a Project overview, map, schedule (including registration timing), future planned engagement activities, and the proposed approach to archaeology assessments. April 9, 2026 – update on EA registration timing provided. April 16, 2026 – Notified the EA Branch of the official Project name and the approach to optional turbines and noise/shadow flicker monitoring within the EA. April 29, 2026 – Presented additional details to EA Branch staff for the Project and Wind Farm 3. Discussed submission details for the EA and answered questions.
NSECC – Protected Areas and Ecosystems Branch	Kermit deGooyer Craig Smith Oliver Maass Lynda Weatherby	July 18, 2024 – EverWind representatives met with NSECC to provide a broad project update and discuss specific conservation measures being proposed for EverWind's Windy Ridge Wind Project. August 16, 2024 – The Proponent met with NSECC to provide a Project update.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		June 30, 2025 – Meeting requested for the Proponent to provide overview of layout updates and setback distances from the Upper Afton and Phase 2 Projects July 16, 2025 – Presentation provided to NSECC in advance of the meeting. July 17, 2025 – Presentation provided on the EverWind Guysborough Projects. Discussed interactions with Loon Lake Nature Reserve and Project infrastructure placement. March 20, 2026 – project update memo and information related to distance to nearest protected area provided. April 29, 2026 – Presented Project details to Protected Areas staff and discussed design considerations for the Project and Wind Farm 3.
NSECC	Wetland Specialist	June 8, 2023 – Reviewed methodology for baseline wetland data collection. This included the proposed use of drone surveys in currently inaccessible areas to supplement wetland delineation ground surveys. April 29, 2026 – Presented Project details to the Wetland Specialist and discussed permitting pathways and the use of drones for wetland assessments for the Project and Wind Farm 3.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
NSECC	Surface Water Quality Specialist	July 13, 2023 – Reviewed methodology for baseline watercourse data collection. This included the proposed use of drone surveys in currently inaccessible areas to supplement watercourse assessments.
NSECC	Senior Hydrogeologist Stormwater Engineer	April 29, 2026 – Presented Project details to NSECC staff and discussed EA methodology for the Project and Wind Farm 3.
NSNR	Donna Hurlburt	June 4, 2025 – Provided an update on the Project via email including details on the biophysical surveys conducted from 2023 to 2025, and timing of EA registration.
	Sarah Spencer	March 23, 2026 – NSNR provided information regarding location sensitive species records (Mainland moose, wood turtle, bat occurrence/hibernacula, peregrine falcon) within and near the Study Area. Correspondence specific to each location sensitive species is detailed in the applicable VC chapters.
	Mark McGarrigle	March 18, 2026 – Reached out to NSNR regarding the ACCDC results to clarify positioning of location sensitive species. March 20, 2026 – Project update memo provided that included a Project overview, map, schedule (including registration timing), a summary of VCs being assessed, and guides used to develop field studies. April 17, 2026 – Informed NSNR of official project date and updated on EA registration timing.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
	Mark McPhail	April 29, 2026 – Presented Project and EA details to NSNR for the Project and Wind Farm 3.
Office of L'nu Affairs	Senior Consultation Advisor	May 17, 2024 – Provided an update on the Project and the status of the archaeology assessment and engagement with the Mi'kmaq of Nova Scotia. June 4, 2025 – Provided an update via email on EA registration timing and a summary of engagement with the Mi'kmaq of Nova Scotia completed to date. March 20, 2026 – Project update memo provided that included a Project overview, map, schedule (including registration timing), future planned engagement activities, and the proposed approach to archaeology assessments. April 17, 2026 – Informed OLA of official Project date and updated on EA registration timing. April 29, 2026 – Presented Project details to OLA staff and discussed MEKS implementation for the Project and Wind Farm 3.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
Communities, Culture, Tourism, and Heritage (CCTH)	John Cormier	July 8, 2025 – CRM Group, on behalf of the Proponent, engaged with the Special Places Protection Program (Special Places) of CCTH and given the Projects overall scale and because the overall design of the Project is expected to continue to evolve, Special Places agreed that only the desktop component of an archeological resource impact assessment (ARIA) is required to be conducted at this time. Special Places further directed that, following finalization of the Projects layout and prior to construction, a qualified archaeologist must conduct a visual inspection and field reconnaissance.
Member of the Legislative Assembly (MLA) – Guysborough Tracadie Minister of Agriculture	Greg Morrow	May 17, 2024 – Invitation to attend upcoming open houses. October 10, 2024 – Project update and note to address resident concern. December 9, 2024 – Email follow-up regarding the Project and specifically a case study highlighting a reduction of greenhouse gas (GHG) emissions when compared to use of fossil fuels. June 10, 2025 – Email invitation to join our community presentation on June 19, 2025. The Minister joined the event in person on June 19, 2025.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
		March 24, 2026 – Community sessions poster placed at MLA office. April 15, 2026 – Verbal update provided on Project, open houses and next steps.
NS Department of Public Works (NSPW)	Darcey MacBain Devon Pinks	November 19, 2025 – Discussed requirements for turbine deliveries and work within public road right of ways. Tentative turbine component delivery routes should be provided to the NSPW in advance of the full Traffic Management Plan for NSPW to identify bridges or other structures requiring engineering assessment.
NS Department of Emergency Management	Jeffrey Moffat	March 30, 2026 – Meeting held to discuss the microwave link telecommunications systems in the area of Ocean Lake Wind Farm and Wind Farm 3, potential interference, and possible mitigations.
Municipal Government		
MODG Staff	Gordon MacDonald Sean O'Connor Deborah Torrey Jason Thorpe	October 17, 2023 – Meeting held with Director of Economic Development to update on Project and community engagement. April 7/8, 2026 – Sean O'Connor and Jason Thorpe attended public information sessions in Larrys River and Goldboro. Regular meetings held with planning staff from 2023 to 2026.

Government Departments, Agencies, & Regulators	Representative	Dates, Activities, Comments
MODG Council	MODG Council	January 24, 2024 – Project introduction presentation to MODG Council and staff. May 17, 2024 – Invitation to join the May and June community open houses. October 2, 2024 – Invitation for councilors and staff to join the CLC for the Setapuktuk Wind Project. June 10, 2025 – Invitation for councilors and staff to join a community presentation for the Project on June 19, 2025, in Guysborough at the Chedabucto Lifestyle Complex. October 15, 2025 – Update to Council on the Upper Afton Wind Project, Strait Crossing Transmission Line Project, and Phase 2 wind projects. March 24, 2026: Briefed Warden and district councillors on upcoming community sessions. April 1, 2026: Invitation email for upcoming public information sessions sent to councillors April 7/8, 2026: District 6 and 7 councillors attended public information sessions.

6.1.2 Review of Government Concerns

Discussions with federal regulators focused on Project infrastructure location and engagement related to EMI (Section 6.3.3).

Discussions with provincial regulators focused on environmental impacts, survey approach, Mi'kmaq of Nova Scotia and public engagement, Project timelines, as well as infrastructure siting and design. All regulators highlighted the importance of sharing Project information early and in as much detail as possible.

The Project Team has had engagements with the municipal Chief Administrative Officer, planner, economic development staff, councillors, and Warden throughout the development of the Project. No concerns were brought forward to date from planning staff. Municipal councillors voiced community concerns related to land use, general environmental impact, health concerns related to noise, and accommodations for people through the construction phase.

The Proponent has negotiated and executed a Community Benefits Agreement (CBA) with MODG. The Proponent is committed to continuing to engage with municipal staff, councillors, and community members on an ongoing basis.

Engagement with government officials will continue through development, construction, and operational phases of the Project.

6.2 Public and Stakeholder Engagement

The Project Team has been involved in formal engagement activities with the public and stakeholders to ensure the community was made aware of the Project and given ample opportunity to receive information, ask questions, and share local knowledge.

Engagement with the public and stakeholders will continue through development, construction, and operational phases of the Project. Table 6.2 summarizes engagement with stakeholders.

Table 6.2: Stakeholder Meetings and Events

Community/Stakeholder Organization	Engagement
St. Mary's Education Centre/Academy	May 23, 2025 - Attended the SMECA Community Career Connect event at St. Mary's Education Centre/Academy. The event was attended by 15 other companies and around 50 students from grades 7 to 12.
Strait Regional School Board	October 18, 2023 – School event to discuss potential career opportunities.
Nova Scotia Community Services	October 20, 2023 – Meeting with Nova Scotia Community Services Guysborough District Office and met with staff regarding employment opportunities and Project update for the Phase 2 developments in MODG.
Antigonish Chamber of Commerce Speaker Series	March 19, 2024 – This event brought together business leaders, entrepreneurs, and community members for a discussion on EverWind and the Project. Attendees had the opportunity to gain insights and engage in conversations surrounding the future of green hydrogen and ammonia production in Nova Scotia and wind development in Guysborough.
Strait Area Chamber of Commerce	April 11, 2024 – VISION 2024 Business Update and Trade Fair Director of Public Affairs presented on the panel with a focus on transformative industry. August 13 and 14, 2024 – Hosted two Summer Networking Socials, which included Project updates and a discussion of green hydrogen and ammonia production.
Chedabucto Snowmobilers Club within the Snowmobilers Association of Nova Scotia	May 27, 2024 – Email invitation to May and June 2024 open houses with opportunity to meet regarding the Project.
Strait Area Education Recreation Centre	October 18, 2024 – Site tour and presentation to the Point Tupper Terminal for 32 high school students studying chemistry and physics to discuss the Project, green energy transition, and future opportunities.
Guysborough Academy	November 7, 2024 – Proponent contacted Vice Principal and Guidance Councillor regarding a site tours and extended an invitation to teachers/students to join the CLC and to discuss future employment opportunities. May 7 and 8, 2025 – Presented to all grade 9 to 11 students regarding the Project, renewable energy and future opportunities. Opportunity for questions and discussion at the end.

Community/Stakeholder Organization	Engagement
	May 23, 2025 – Site tour at the Point Tupper Terminal for 45 students and staff from Guysborough Academy to discuss the Project, existing infrastructure, transition to green fuels and tour the Facility.
Antigonish East Education Centre	October 18, 2024 – Site tour and presentation to the Point Tupper Terminal for 30 high school students studying to discuss the Project, green energy transition, and future opportunities.
Strait Area of Commerce	December 4, 2024 – Proponent hosted a site tour at Point Tupper Terminal, which included a 50-minute presentation, and a 20-minute question and answer discussion period for Strait Area Chamber of Commerce and Chamber Past Presidents to discuss the Project, current operations and upcoming plans.
Dr. John Hugh Gillis Regional High School Community Career Connect Event	May 2, 2025 – Proponent presented on the Project to highlight potential career opportunities.
St. Francis Xavier University Site Tour	May 16, 2025 – Proponent presented and conducted a guided site tour in Point Tupper for chemistry and engineering students and faculty.
Dalhousie Roundtable Community Meeting	May 27, 2025 – EverWind hosted in the Guysborough Project Office a delegation from Dalhousie University including the Dean of Science, Vice President of Strategic Engagement and Government Relations, Chair of Department of Chemistry, Director of the Clean Technologies Research Institute, Associate Dean Research, Department Of Industrial Engineering as well as representatives from local municipalities, community organizations and business groups to discuss the Project and industry in the Strait Area.
Residents of New Harbour and Ocean Lake Riders ATV Club	November 24, 2025 – Met with seven community members to discuss the Project and gather feedback.
The Ocean Lake Riders ATV Club	December 19, 2025 - Project overview provided and review of trail maps. Provided a list of attendees and discussed future community involvement. Request to follow up with organization regarding trail maps for design consideration. April 7, 2026 – members of the Ocean Lake Riders ATV Club attended the New Harbour open house and brought trail maps to discuss overlap with the Project.

Community/Stakeholder Organization	Engagement
Nova Scotia Works Career Connections	February 12, 2026 - Nova Scotia Works Career Connections invites recipients to the annual Spring Antigonish Guysborough Job Fair on March 25, 2026, at the East Coast Credit Union Social Enterprise Centre. The event offers exhibitor registration and a complimentary lunch sponsored by Mentor Ability.
Nova Scotia Youth Climate Council	February 25, 2026 - Discussed the planning and coordination for a presentation from EverWind to the Nova Scotia Youth Climate Council on February 24, 2026. The presentation focused on the impact of clean energy on Nova Scotia's job market, particularly in wind energy and green hydrogen.
Snowmobilers Association of Nova Scotia (SANS)	February 26, 2026 - Discussed Project updates and collaboration between EverWind and SANS.
New Harbour River Restoration Association (NHRRA)	March 23, 2026 – Project team member attended the Annual General Meeting of the NHRRA at the New Harbour Community Center. March 24, 2026 – follow up email sent to NHRRA to extend an invite to the Ocean Lake Wind Project public open houses.
Erinville Volunteer Fire Department	April 6, 2026 – The Proponent provided an update on the Project, shared details about upcoming public information sessions to gather community feedback, and offered to arrange a dedicated information session for the local fire department to discuss Project details and emergency response considerations.
Chedabucto Volunteer Fire Department	April 6, 2026 – The Proponent provided an update on the Project, shared details about upcoming public information sessions to gather community feedback, and offered to arrange a dedicated information session for the local fire department to discuss Project details and emergency response considerations.
Three Top Fire Department	April 6, 2026 – The Proponent provided an update on the Project, shared details about upcoming public information sessions to gather community feedback and offered to arrange a dedicated information session for the local fire department to discuss Project details and emergency response considerations.

Community/Stakeholder Organization	Engagement
Milford Haven Fire and Emergency Services	April 6, 2026 – The Proponent provided an update on the Project, shared details about upcoming public information sessions to gather community feedback and offered to arrange a dedicated information session for the local fire department to discuss Project details and emergency response considerations.
Larrys River and District Volunteer Fire Department	April 6, 2026 – The Proponent provided an update on the Project, shared details about upcoming public information sessions to gather community feedback and offered to arrange a dedicated information session for the local fire department to discuss Project details and emergency response considerations.

6.2.1 Project Naming

Ocean Lake Wind Project was selected by community members surrounding the Project through a vote on options displayed on a poster board during the April 7 and 8, 2026, public open house events in Larrys River, New Harbour, Goldboro, and Erinville. The name Ocean Lake Wind Project is both geographically grounded and locally meaningful, drawing from Ocean Lake - the largest lake within the Study Area and a well-known natural landmark in the region.

6.2.2 Digital Communications

The Proponent has maintained a website since July 4, 2024 (<https://guysboroughwind.ca/home> transitioned to <https://everwindfuels.com/projects/guysborough-wind-projects/> on December 12, 2025). It includes information about the Project and Proponent. This publicly accessible website continues to be updated regularly.

A dedicated email inbox was set up on July 14, 2023 (guysboroughwind@everwind.ca transitioned to info@guysboroughwind.com on October 28, 2025 for consistency across all Projects. Note, the guysboroughwind@everwind.ca email still remains active) to address all aspects of the EverWind Portfolio of Projects in Guysborough. The email inbox is actively monitored by the Proponent. The Proponent has invited the public to reach out and engage with the lead contact through the Project social media channels, including LinkedIn and Facebook. The public was specifically invited to provide feedback and questions.

6.2.3 Public Open House Events

In total, 23 open houses were held from May 2023 to April 2026 (Table 6.3). Some open houses featured the Setapuktuk Wind Project (formerly Wind Farm 1) or the Strait Crossing Transmission Line but are shown as they included EverWind's broader Phase 2 plans.

Table 6.3: Summary of Open Houses

Open House Number	Open House Date	Location	Number of Public Attendees ⁽¹⁾	Exit Surveys Completed
1	May 15, 2023	Lincolnville Community Hall	19	9
2	May 15, 2023	Boylston Community Centre	12	6
3	May 16, 2023	St. Francis Harbour Hall	11	5
4	May 17, 2023	Chedabucto Lifestyle Complex, Guysborough	29	13
5	May 28, 2024	Boylston Community Centre	10	5
6	May 28, 2024	Lincolnville Community Hall	11	5
7	May 29, 2024	Chedabucto Lifestyle Complex, Guysborough	29	11
8	May 30, 2024	St. Francis Harbour Hall	27	14
9	June 4, 2024	Erinville Fire Hall	6	4

Open House Number	Open House Date	Location	Number of Public Attendees ⁽¹⁾	Exit Surveys Completed
10	June 4, 2024	Larrys River Communities Along the Bay multi use Facility	7	5
11	June 5, 2024	Harbourview Community Centre, New Harbour	6	7
12	June 5, 2024	Goldboro Interpretive Centre	14	11
13	June 10, 2024	District of St. Mary's Lions Club, Sherbrooke	35	19
14	June 11, 2024	Country Harbour Community Centre	9	8
15	June 11, 2024	Port Bickerton Fire Department and Community Centre	13	12
16	February 5, 2025	Mulgrave Fire Hall	33	3
17	February 6, 2025	Port Hawkesbury Civic Centre	22	2
18	February 6, 2025	Acadiaville Community Center, West Arichat	8	0
19	June 19, 2025	Chedabucto Lifestyle Complex, Guysborough	32	0
20	April 7, 2026	Larrys River Communities Along the Bay multi use Facility	7	0
21	April 7, 2026	Harbourview Community Centre, New Harbour	24	0
22	April 8, 2026	Goldboro Interpretive Centre	17	0
23	April 8, 2026	Erinville Fire Hall	26	0
Total		23	407	139

⁽¹⁾ Only those attendees who sign-in when entering the venue are counted; however, most open houses had more attendees who were not counted.

6.2.3.1 May 2023 Open Houses

Four public open houses (open houses 1 to 4) took place in May 2023, focused on the Setapuktuk Project. The objective of these engagement sessions was to update the community about fieldwork findings, present Crown land allocation, and gather community feedback to inform the Project design. The Project Team presented 10 posters, answered questions, and took feedback from the local community and various stakeholders.

Sign-in sheets were available for participants to provide their contact information and enable follow-up. Exit surveys were also available for participants to provide anonymous feedback.

Open houses 1 to 4 were advertised in the Upper Big Tracadie Seniors Action Club Newsletter (May 2023 edition) and the Guysborough Journal (May 10, 2023, edition), 5 to 7 days prior to the events.



Figure 6.1: Open House 1 (Lincolnton) and 2 (Boylston)



Figure 6.2: Open House 3 (St. Francis Harbour) and 4 (Guysborough)

6.2.3.2 May/June 2024 Open Houses

There were 11 public open houses that took place throughout Guysborough County from St. Francis Harbour to Sherbrooke in May and June 2024 (open houses 5 to 15). The objective of these early engagement sessions was to introduce the community to the EverWind Phase 2 Projects, present the general Project location, and gather community feedback to inform the Projects' design. The Project Team presented 38 posters detailing the full scope of the EverWind Portfolio of Projects, answered questions, and took feedback from the local community and various stakeholders in each of the different communities where open houses

were held. The open houses were publicized in the local paper, on local radio and delivered to all residents via a Canada Post mail drop.

Sign-in sheets were available for participants to provide their contact information and enable follow up. Exit surveys were also available for participants to provide anonymous feedback.

Open Houses 5 to 15 were advertised in the Guysborough Journal (May 15, 2024, and May 29, 2024, editions) and via Canada Post Neighbourhood Mail.



Figure 6.3: Open House 5 (Boylston) and 6 (Lincolnton)



Figure 6.4: Open House 7 (Guysborough) and 8 (St. Francis Harbour)

6.2.3.3 February 2025 Open Houses

Three additional open houses were held on February 5 and 6, 2025 in Mulgrave, Port Hawkesbury, and West Arichat (Open Houses 16 to 18). These three open houses were specific to the Strait Crossing Transmission Line, but all Phase 2 Wind Projects were also discussed due to their connection to the Strait Crossing Transmission Line.

Sign-in sheets were available for participants to provide their contact information and enable follow-up. Exit surveys were also available for participants to provide anonymous feedback.

Notices for open houses 16 to 18 were published on January 22 and January 29, 2025, in the Guysborough Journal and the Port Hawkesbury Reporter. Two weeks in advance of the open houses, notices were posted at EverWind's Guysborough Project Office, the Guysborough Post Office, the Mulgrave Post Office, the Independent Grocer (Guysborough), the entrance of the MODG office (Guysborough), the Port Hawkesbury Civic Centre, the Arichat Post Office (Richmond County) and at the Acadiaville Community Centre (Richmond County). Additionally, EverWind representatives visited 17 residences in proximity to the Steep Creek side of the Strait Crossing Transmission Line Project and spoke with the homeowners to invite them to the open houses or left an invitation at the door if the homeowner was not present.

6.2.3.4 June 2025 Public Information Session

On June 19, 2025, EverWind provided a presentation focused on the Setapuktuk Wind Project to the public at the Chedabucto Lifestyle Complex (open house 19). Maps of the Project layout, noise assessment, and shadow flicker assessment were also provided. This presentation was followed by 90-minute question and answer (Q&A) period. The presentations and Q&A structure of the event were selected based on direct result of feedback from the community and the request of a member of the community liaison committee (CLC).

Additional information regarding the Ocean Lake Wind Project and Wind Farm 3 Project were provided, though they were not the primary focus of the session.

Sign-in sheets were available for participants to provide their contact information and enable follow up. Exit surveys were also available for participants to provide anonymous feedback.

Open house 19 was advertised via paid advertisements in the Guysborough Journal for two weeks leading up to the events and on the local radio station. Additional notices were circulated to the CLC members to post on community social media sites.



Figure 6.5: Open House 19 (Guysborough)

6.2.3.5 April 2026 Open Houses

On April 7, and 8, 2026, EverWind hosted Open Houses 20 through 23 in communities surrounding the Study Area: Larrys River, New Harbour, Goldboro, and Erinville. The objective of these engagement sessions was to present the detailed Project layout and gather community feedback to further inform refinement. The Project Team presented 22 posters detailing EverWind's Portfolio of Projects, specifics about the Ocean Lake Wind Project layout, environmental studies performed since 2023, and next steps in Project progression. Maps of the Project layout, noise assessment, shadow flicker assessment, and visual simulations were displayed and digital copies made available on the website. Several members of the Project team were in attendance to answer questions posed by members of the public.

The open houses were publicized in the Guysborough Journal for two weeks leading up to the events, on local radio, and posted in a number of locations in the community including the EverWind office, Mann's Independent Grocer, MODG office, Erinville Firehall, Larrys River Community Hall, Larrys River post office, New Harbour Community Centre, Pump House Fuels in Drum Head, Goldboro Interpretive Centre, and the MLA office in Guysborough. Additional notices were circulated to the Setapuktuk CLC members to post on community social media sites.

Sign-in sheets were available for participants to provide their contact information and enable follow up. Exit surveys were also available for participants to provide anonymous feedback.



Figure 6.6: Open House 20 (Larrys River) and 21 (New Harbour)



Figure 6.7: Open House 22 (Goldboro) and 23 (Erinville)

6.2.4 Additional Engagement with Adjacent Businesses and Associations

The Proponent has engaged directly with three adjacent businesses: Maritimes & Northeast Pipeline (M&NP), NexGold, and NSF (Drawing 6.1).

Maritimes & Northeast Pipeline (M&NP)

M&NP owns and operates a natural gas pipeline by the same name, which includes a trenched and buried segment from Goldboro to Point Tupper known as the Point Tupper Lateral. The Point Tupper Lateral intersects the western portion of the Study Area running north-south.

The Proponent has designed the Project to minimize interaction with the pipeline. Turbines setbacks have been designed in excess of the 130 m hub height and turbine construction will not infringe on the pipeline easement area. The Proponent has engaged with M&NP with respect to turbine locations, road crossings, medium voltage power line crossings and high-voltage transmission line routing, and discussions are ongoing at the time of EA submission.

NexGold (Goldboro Gold Project)

NexGold is developing the Goldboro Gold Project, gold mine near Goldbrook Lake and within the southern extent of the Study Area.

The Proponent has engaged with NexGold to share Project siting information and discuss potential impacts on land use and wind resource due to mining operations, and shared use of worker accommodations. One Project turbine has been removed from the layout to avoid direct impact with NexGold operations.

Nova Sustainable Fuels

NSF is developing a sustainable aviation fuel production facility in Goldboro, NS, with associated water pipeline and transmission infrastructure that is expected to intersect the southern portion of the Study Area.

Proponent has engaged with NSF for the purpose of coordinating locations of planned infrastructure and shared use of temporary construction facilities. Discussions are ongoing at the time of EA submission.

The Proponent also engaged directly with community associations.

Ocean Lake Riders ATV Club

Members of the Ocean Lake Riders attended the April 7, 2026, open house in New Harbour and brought trail maps to discuss overlap with the Project

The Proponent has engaged directly with the Ocean Lake Riders ATV Club to understand their existing trail infrastructure, future plans, and how the trails interact with the proposed Project. The Proponent has met with members of the club on two occasions (November 24, 2025 and December 19, 2025) and is committed to ongoing collaboration through the development, construction and operational phases of the Project. The Proponent extended an invitation to the April 2026 public open houses.

New Harbour River Restoration Association (NHRRA)

NHRRA members attended the June 5, 2024, open house in New Harbour to learn more about the Project.

The Proponent attended the NHRRA AGM on March 23, 2026, to better understand the past, present and future priorities of the association. Specifically, EverWind is interested in partnership opportunities with the NHRRA.

La Societe Acadienne de Torbé

The Proponent met with representatives of La Societe Acadienne de Torbe on November 19, 2025, to discuss the proprieties of la Societe, proposed Project development and future alignment with the objectives of La Societe.

6.2.5 Office

A publicly accessible EverWind office is open in Guysborough. Office hours were advertised in the EverWind e-newsletter beginning in May 2024. Community members are encouraged to drop by the office to ask questions or discuss concerns with a Project representative.

Several office barbeques also took place in June and July 2024 to encourage community members to visit the office who may not otherwise do so. Over 40 people attended these events. Standard office hours of Tuesday and Wednesday from 10:00 am until 4:00 pm have been maintained since May 2024.

Several community members attended the office hours following the community information sessions as they were unable to attend the specific community events. The main questions and concerns raised are documented in Section 6.2.7.

6.2.6 Community Liaison Committee

The Proponent is committed to establishing a CLC for this Project in late 2026 or 2027 to support community engagement and dissemination of Project related information.

6.2.7 Review of Concerns

Issues and concerns raised by the public have been grouped into broader categories and reference to the relevant section of the EA in which the concern is addressed have been noted (Table 6.4).

Table 6.4: Comments Received from the Public

Key Issues	Proponent Response	Section of EA
Socioeconomic Impacts		
Will there be a Community Liaison Committee for this Project?	Yes, the Proponent is committed to establishing a CLC for the Project.	Section 6.2.6
What kind of investments/ programs are planned for local communities?	The Proponent will create a Community Benefits Fund to provide direct payments to communities, starting at the end of the first year of operations. The payments for the Phase 2 portfolio of projects are based on \$1,000 per MW of nameplate capacity and expected to be over 2 million dollars each year or 70 million dollars over the life of the projects. The CLC will advise how the fund is distributed. The Proponent has signed a CBA with MODG and is actively working to secure one with the Municipality of the District of St. Mary's.	Section 11.1
Will jobs be created by the Project be given to local workers?	The Proponent is committed to sharing economic opportunities with the local community throughout the development and lifespan of the Project via the use of local skills and labour where practicable. The Proponent will maximize local content where appropriate. To this end, the Proponent will hold a job fair prior to the start of construction to engage with local community members and service providers and identify suitable candidates and/or businesses to support the construction phase employment and service providers.	Section 11.1
Is shadow flicker a health concern?	No, shadow flicker is considered an annoyance but is not a health concern. Predictive modelling completed to support the EA indicates the Project is in compliance with provincial standards. Compliance will continue to be maintained during operations.	Section 7.4

Key Issues	Proponent Response	Section of EA
What is the complaint resolution process for noise?	NSECC requires sound levels of no more than 40 dBA outside of a residential receptor. For context, 40 dBA is equivalent to the sound of a quiet library. Sound modelling results of the Project indicate that all residential receptors will fall below the 40 dBA threshold. The Proponent will implement a Complaint Resolution Plan to investigate and mitigate (if required) noise related complaints.	Section 7.3
Is this an offshore wind project?	No, this Project is an onshore wind Project.	N/A
Why is this Project so large compared to other wind projects in the province?	Wind energy projects are typically sized based on a combination of factors, and projects are often limited by the capacity of existing transmission lines and the availability of suitable land. For this Project, the development area is relatively large and sparsely populated, which provides greater flexibility for turbine siting while maintaining appropriate setbacks from residences and environmental features. In addition, the Project includes the development of new transmission infrastructure, meaning it is not constrained by the capacity of existing high-voltage lines. Designing the Project at this scale allows for more efficient energy generation and can increase overall local and regional benefits.	N/A
Environmental Impacts		
How are spills responded to?	The Proponent will develop and implement a Contingency Plan that outlines measures to prevent spills, as well as procedures to respond effectively should a spill occur. In the event of a spill, the Plan will establish procedures for immediate containment, control, and clean-up, including the use of appropriate spill response equipment. It will also outline notification and reporting requirements in accordance with applicable regulations.	Section 15.3
How will this Project impact birds and bats?	A full desktop review and extensive field surveys, including radar and acoustic monitoring, have been completed to identify the presence, abundance, and movement patterns of birds and bats as well as their habitat across the Study Area.	Sections 10.3 10.4

Key Issues	Proponent Response	Section of EA
	The results of these assessments are used to inform Project design, including turbine siting and layout, to avoid or minimize potential impacts where possible. In addition, mitigation measures will be implemented. Post-construction monitoring will also be carried out to assess actual effects on birds and bats. If monitoring identifies higher-than-expected impacts, adaptive management measures will be implemented in consultation with NSECC, NSNR, and ECCC. The Proponent has also committed to the development and implementation of a Terrestrial Habitat and Wildlife Management Plan.	
Were moose identified during field surveys?	Yes, mainland moose were identified during baseline field surveys. Monitoring for mainland moose is anticipated to be required during operations, pending EA Approval.	Section 10.2
Do wind turbines scare away wildlife?	The potential for wind turbines to affect wildlife, including whether they may cause animals to avoid an area, is considered as part of the EA. Research indicates that some wildlife species may exhibit temporary avoidance behaviour during construction due to increased noise and human activity. However, many species return to the area once construction is complete and activity levels decrease. During operations, wind turbines are generally not associated with long-term displacement of most wildlife species.	Section 10.2
How will the Project affect fish?	Where Project infrastructure intersects with watercourses, all crossings will be designed and constructed in accordance with applicable regulatory requirements and will be subject to the necessary authorizations from relevant authorities, including NSECC and DFO, where applicable. Construction activities near watercourses will be carefully managed to reduce potential effects on fish habitat. This includes timing work to avoid sensitive fish spawning and migration periods (known as in-water work timing windows) and implementing best management practices to prevent sediment release.	Section 9.1

Key Issues	Proponent Response	Section of EA
	A Surface Water Management Plan and an Erosion and Sediment Control Plan will be developed and implemented for the Project.	
Will the Project impact my well water?	If blasting is required for construction, groundwater wells within 800 m will undergo an assessment in accordance with NSECCC's Procedures for Conducting a Pre-blast Survey (NSECC, 1993). If demonstrable changes in groundwater quantity or quality to a well are detected due to Project activities, an alternative water supply, of equal or better quantity/quality that that impacted will be provided to the landowner.	Section 8
General		
Questions about wind turbine layout	The Project layout is designed to incorporate public feedback and mitigate environmental impact as far as reasonably practicable (e.g. avoiding areas where protected species have been identified).	Section 3.3
Will there be enough housing capacity to support new and local workers?	The Proponent is committed to continued engagement with MODG on current and future resourcing needs including housing. The Proponent is also considering a temporary worker accommodation in cooperation with other industrial projects in the area.	Section 3.5.5
Can residents continue to use Crown land?	Yes, the Proponent is not proposing to install gates or restrict access. For public safety, temporary restrictions may be required during active construction and the substation will be fenced.	Section 11.2
What fire prevention methods go into wind farm design?	Fire prevention and safety are key considerations in wind farm design and operation. Modern wind turbines are equipped with advanced monitoring and control systems that continuously track operating conditions such as temperature, vibration, and electrical performance. If abnormal conditions are detected that could indicate a risk of fire, the turbine is designed to automatically shut down to prevent escalation. Turbine fires are very rare. From a design perspective, vegetation management is an important mitigation measure. Typically, trees, brush, and other combustible material are cleared and maintained within a defined radius around each	Section 15.2

Key Issues	Proponent Response	Section of EA
	turbine. The Proponent will develop and implement a Contingency Plan and continue to engage with local fire authorities.	
How do you move turbine components to site? There are a lot of sharp turns and wooden bridges in the area.	The Proponent is currently evaluating a range of transportation options to safely and efficiently deliver components to the site. A key focus is the potential use of marine transport to staging areas located close to the Project. This approach could significantly reduce the need to transport large components over long distances on local roads. Where overland transport is required, detailed route assessments will be completed to identify constraints such as tight turns, bridge capacities, and road widths. All transportation activities will be planned and carried out in coordination with relevant authorities to ensure public safety and to minimize disruption to local communities.	N/A
How will the Project be decommissioned? Are entire turbine foundations removed during decommissioning?	Prior to decommissioning, NSECC and MODG will be provided with decommissioning plans for review and compliance with the Project's EA conditions. Opportunities for repowering will be considered prior to entering the decommissioning phase. Decommissioning of turbine foundations will go to approximately 1 m below surface grade. Turbines sites and other laydown areas will have gravel removed and native soils typically respread to and graded similar to original conditions.	Section 3.6.3
Are the optional turbines included in the noise and shadow flicker models?	No, the 15 optional turbines have not been included in the noise and shadow flicker modelling completed as part of this EA. Should these turbines be constructed, updated noise and shadow flicker modelling will be completed and provided to NSECC to demonstrate compliance.	Sections 7.3 and 7.4
Are any turbines on private land?	Yes, one optional turbine (Turbine OT4) is currently sited on private land.	N/A
Why is there no light on top of the MET towers?	The MET towers on site are below the height threshold requiring lighting by Transport Canada.	N/A

Key Issues	Proponent Response	Section of EA
Is Aircraft Detection Lighting Systems (ADLS) being considered for this Project to maintain dark skies at night?	Yes, the Proponent is considering light mitigation technologies including ADLS, as allowable by relevant regulations.	N/A
How does the power generated by the Project get to Point Tupper?	Renewable electricity generated by the Project will be transmitted to Point Tupper via a new transmission line to be constructed, owned, and operated by EverWind. This transmission line is not included within this EA.	Section 3.5.3
Is there potential for turbine height to increase?	Yes, the Proponent is considering concrete towers, manufactured on-site or nearby, to maximize local content and in response to international steel tariffs. This may require a tower height increase of up to 150 m. Noise and shadow flicker modelling will be updated and siting adjustments made to maintain compliance if the tower height or turbine model is changed.	Section 3.5.1

6.2.8 Ongoing Engagement

The Proponent is committed to continuing to work to address any concerns raised by stakeholders and members of the public over the duration of the Project's life. Additionally, once established, the CLC will meet at regular intervals throughout the lifespan of the Project, until such a time that it is deemed unnecessary.

6.3 **Electromagnetic Interference Engagement**

The rotating blades and support structures of wind turbines can interfere with various types of electromagnetic signals emitted from telecommunication and radar systems (RABC & CanWEA, 2020).

EMI created by a wind turbine can be classified into two categories: obstruction and reflection. Obstruction occurs when a wind turbine is placed between a receiver and a transmitter, creating an area where the signal is weakened and/or blocked. Reflection is caused by the distortion between a raw signal and a reflection of the signal from an object. Scatter is a sub-category of reflection caused by the rotor blade movement.

The EMI assessment identified point-to-point, broadcast systems, radar, navigation, and communications systems susceptible to the effects of windfarm interference. The specific characteristics of a wind turbine will influence the type and magnitude of the interference. Other factors that influence interference include blade dimension and design, tower height, diameter of the supporting tower, as well as the material used for blade and tower construction.

6.3.1 Assessment Guidelines

The Radio Advisory Board of Canada (RABC) and Canadian Renewable Energy Association (CanREA) developed guidelines for assessing the EMI potential from a wind turbine development: Technical Information and Coordination between Wind Turbines and Radiocommunication and Radar Systems; hereafter referred to as the RABC Guidelines (RABC & CanWEA, 2020). These guidelines outline a consultation-based assessment protocol that establishes areas, called “consultation zones”, around transmission systems, based on the type and function of the system.

6.3.2 Assessment Methods

Consultation is generally the best method of notification, and this process typically begins with a letter distribution to those parties affected by the development. A summary of the RABC Guidelines for determining consultation zones is in Table 6.5.

Table 6.5: RABC Guidelines – Recommended Consultation Zones

Systems	Consultation Zone
Point-to-Point Systems above 890 megahertz (MHz)	1 km
Broadcast Transmitters (AM, FM, and TV stations)	AM station: 5 km for omnidirectional (single tower) antenna system 15 km for directional (multiple towers) antenna system FM station: 2 km TV station: 2 km
Over-the-Air Reception (TV off-air pickup, consumer TV receivers)	Analog TV Station (NTSC): 15 km Digital TV (DTV) station (ATSC): 10 km
Cellular Type Networks, Land Mobile Radio Networks, and Point-to-Point Systems below 890 MHz	1 km
Satellite Systems (Direct to Home, Satellite Ground Stations)	500 m
Air Defence Radars, Vessel Traffic Radars, Air Traffic Control Radars, and Weather Radars	Department of National Defence (DND) Air Defence Radar: 100 km DND or NAV Canada Air Traffic Control Primary Surveillance Radar: 80 km DND or NAV Can Air Traffic Control Secondary Surveillance Radar: 10 km

Systems	Consultation Zone
	DND Precision Approach Radar: 40 km
	Canadian Coast Guard Vessel Traffic Radar System: 60 km
	Military or Civilian airfield: 10 km
	Environment Canada Weather Radar: 50 km
Very High Frequency OmniRange	15 km

To conduct an EMI assessment, the following information regarding turbine design and placement is generally required to complete notifications:

- Turbine Universal Transverse Mercator (UTM) coordinates
- Number of turbines
- Ground elevation
- Tower/hub height of each turbine
- Nacelle height
- Rotor diameter
- Turbine blade sweep diameter (or length of blades)
- Turbine base diameter
- Substation/converter location coordinates and height(s) along with new transmission line(s) to connect to a grid.

Response time and feedback from the various organizations vary and can take several weeks. If turbine type, layout, or design changes, many organizations will need to be re-consulted prior to proceeding.

6.3.3 EMI Engagement Summary

Engagement with relevant government and community stakeholders was completed and results are provided in Appendix B. In addition to what is documented in the EMI Report (Appendix C), the Proponent has further consulted with Bell Canada and the Nova Scotia Department of Emergency Management and is continuing to work with both stakeholders.

7.0 **ATMOSPHERIC ENVIRONMENT**

7.1 **Atmosphere and Air Quality**

7.1.1 Overview

The assessment of the atmospheric environment included a review of weather, climate, and air quality data.

7.1.2 Regulatory Context

Relevant legislation includes:

- *Environment Act* (Nova Scotia, 1995b)
- Air Quality Regulations (Nova Scotia, 2020)

7.1.3 Assessment Methodology

The assessment was completed through a review of the following resources:

- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- ECCC Weather and Climate (ECCC, 2025d)
- NSECC Ambient Air Quality Data (NSECC, n.d.-a)

7.1.4 Assessment Results

Weather and Climate

Nova Scotia's climate is quite varied and is largely governed by coastal influences and elevation (Davis & Browne, 1996). The Study Area is located primarily within the Eastern Interior Ecodistrict (440), with the south and eastern sections within the Eastern Shore Ecodistrict (820), and a small northern section within the Mulgrave Plateau Ecodistrict (Drawing 7.1). These ecodistricts are typically cooler and more humid, with strong coastal winds (Neily et al., 2017).

To assess the local climate, weather data (1996 to 2025) were obtained from the Collegeville and Collegeville Auto meteorological stations (Climate ID 8201000 and 8201001) (Table 7.1). Although the climate station was not the closest to the Study Area, it contains the most complete dataset relevant to the Project (approximately 35 km). While the meteorological station is near the Project, this data may not exactly represent the conditions observed within the Study Area.

Table 7.1: Climate Data from the Collegeville Meteorological Stations (1996 to 2025)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (°C)													
Daily Average	-5.2	-5.8	-1.7	3.4	9.1	14.1	18.7	18.5	14.4	8.8	3.8	-1.6	6.4
Daily Maximum	-0.6	-0.9	3.2	8.3	15.2	20.3	24.8	24.6	20.6	14.3	8.1	2.4	11.7
Daily Minimum	-9.9	-10.7	-6.5	-1.6	2.9	7.9	12.5	12.4	8.1	3.3	-0.6	-5.6	1.0
Extreme Maximum	15.2	15.0	26.5	29.0	32.0	34.3	36.0	35.0	33.5	29.8	23.2	30.0	28.3
Extreme Minimum	-31.2	-29.9	-27.9	-22.3	-13.5	-4.4	1.0	1.0	-5.4	-8.9	-14.1	-24.0	-15.0
Precipitation (mm)													
Precipitation	94.2	85.0	86.9	81.4	76.5	97.4	86.9	97.5	102.9	131.4	137.8	113.3	1,191.1

Source: (ECCC, 2025d)

Between 1996 and 2025, the mean annual temperature was 6.4°C, with a mean daily maximum of 11.7°C and a mean minimum of 1.0°C. The coldest months were January and February, with mean daily averages of -5.2°C and -5.8°C, respectively. July and August were the warmest, averaging 18.7°C and 18.5°C. Over this period, the meteorological station did not consistently record mean annual snowfall or mean annual rainfall but recorded monthly average precipitation, with the highest occurring in October and November (131.4 mm and 137.8 mm, respectively) (ECCC, 2025d).

Wind speed and direction data were obtained from the Hart Island (Climate ID 8202318) meteorological station (Table 7.2), as it contained the most complete dataset of wind data near the Project.

Table 7.2: Wind Data from the Hart Island Meteorological Station (1996 to 2025)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maximum Hourly Speed (km/h)	126	119	115	135	103	98	100	93	128	115	130	132
Most Frequent Direction⁽¹⁾⁽²⁾	NW	NW	NW	NW	SW	SW	SW	SW	SW	NW	NW	NW

Source: (ECCC, 2025d)

⁽¹⁾NW = northwest

⁽²⁾SW = southwest

From 1996 to 2025, the maximum hourly wind speeds recorded at the Hart Island (Climate ID 8202318) meteorological station ranged from 93 kilometres per hour (km/h) in August to 135 km/h in April. The prevailing wind directions recorded are from the northwest and the southeast. The direction during calm wind flows is not recorded at the meteorological station (ECCC, 2025d).

The windrose plot for the Hart Island (Climate ID 8202318) meteorological station (CWRN) illustrates wind directions from 1996 to 2025 (Figure 7.1). Wind speeds above 12 m/s [43.2 km per hour (km/h)] occurred most frequently from the northwest and southeast (ISU, 2025).

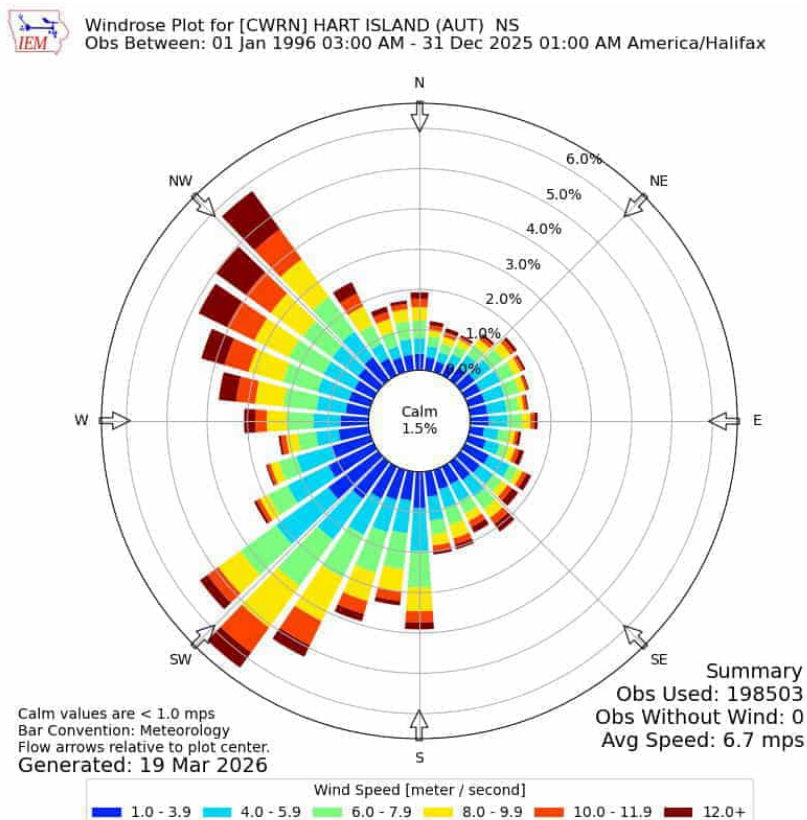


Figure 7.1: Windrose Plot for Hart Island (Climate ID 8202318) meteorological station (CWRN) – January 1, 1996, through December 31, 2025 (ISU, 2025)

Air Quality

The Government of Nova Scotia has legislated Air Quality Regulations (NSAQR) (Nova Scotia, 2020) under the *Environment Act* (Nova Scotia, 1995b). The ambient air quality standards (AAQS) published in the NSAQR set the maximum permissible ground-level concentration limits (Table 7.3).

Table 7.3: Summary of Regulations Pertaining to Ambient Air Quality in Nova Scotia

Contaminant	Averaging Period	Regulatory Threshold ($\mu\text{g}/\text{m}^3$)
		Provincial ⁽¹⁾
Carbon Monoxide (CO)	1-hour	34,600
	8-hour	12,700
Nitrogen Dioxide (NO ₂)	1-hour	400
	24-hour	-
	Annual	100

Contaminant	Averaging Period	Regulatory Threshold ($\mu\text{g}/\text{m}^3$)
		Provincial ⁽¹⁾
Ozone (O_3)	1-hour	160
$\text{PM}_{2.5}$	24-hour	-
	Annual	-
PM_{10}	24-hour	-
	Annual	-
Sulphur Dioxide (SO_2)	1-hour	900
	24-hour	300
	Annual	60
Total Suspended Particulate (TSP)	24-hour	120
	Annual	70 ⁽²⁾

⁽¹⁾Ambient Air Quality Standards (NS AAQS) (Air Quality Regulations, N.S. Reg. 8/2020)

⁽²⁾Geometric mean

$\mu\text{g}/\text{m}^3$ = micrograms per cubic meter

Nova Scotia monitors air quality at eight ambient air quality monitoring stations (AAQMSs) located throughout the province (NSECC, n.d.-a). Measured parameters at these locations may include the following:

- Sulphur dioxide (SO_2)
- Carbon monoxide (CO)
- Nitrogen oxides (NO_x)
- Nitric oxide (NO)
- Fine particulate matter [particulate matter 2.5 micrometres (μm) or less in diameter; $\text{PM}_{2.5}$]
- Ground-level ozone (O_3)
- Total reduced sulphur (TRS)

The NO_2 , O_3 , and $\text{PM}_{2.5}$ values from seven of the eight AAQMSs are used to calculate a score on the Air Quality Health Index (AQHI) (ECCC, 2025a; NSECC, n.d.-a). The AQHI is a scale from 1 to 10+, in which scores represent the following health risk categories: Low (1 to 3), Moderate (4 to 6), High (7 to 10), and Very High (10+) (ECCC, 2025a).

The closest AAQMS with available data is the Port Hawkesbury station, approximately 33 km northeast of the center of the Study Area at 45.61416245° N, 61.36235428° W.

Table 7.4 summarizes the current (baseline) maximum ambient air quality conditions observed at the Port Hawkesbury AAQMS from 2021 to 2025. The monitored parameters are compared to the current NSAQR.

Table 7.4: Maximum Ambient Air Quality Conditions at Port Hawkesbury (2021 to 2025)

Parameter	Averaging Period	O ₃ (ppb) (3)	SO ₂ (ppb)	NO _x (ppb)	NO (ppb)	NO ₂ (ppb)	PM _{2.5} (µg/m ³) (4)	TSP (µg/m ³)	CO (ppb)	H ₂ S (5) (ppb)
Port Hawkesbury AAQMS 2021 to 2025	1-hour	92.5	89.7	139.1	93.9	51.0	64.6	-	-	-
	24-hour	49.1	15.0	51.9	28.5	23.3	27.5	-	-	-
	Annual	29.4	0.7	4.5	1.8	2.6	5.4	-	-	-
NS AAQS Schedule A ⁽¹⁾	1-hour	82	340	-	-	210	-	-	30,000	30
	24-hours	-	110	-	-	-	-	120	-	6
	Annual	-	20	-	-	50	-	70 ⁽²⁾	-	-
Fraction of NS AAQS Schedule A	1-hour	113%	26%	-	-	24%	-	-	-	-
	24-hours	-	14%	-	-	-	-	-	-	-
	Annual	-	4%	-	-	5%	-	-	-	-

Source: (NSECC, n.d.-a)

⁽¹⁾Current NS AAQS (Air Quality Regulations, N.S. Reg. 8/2020)

⁽²⁾Geometric mean

⁽³⁾ parts per billion

⁽⁴⁾ micrograms per cubic meter

⁽⁵⁾ hydrogen sulphide

Existing air quality conditions (i.e., baseline data; 2021 to 2025) indicate that the measured contaminants are well below their respective NS AAQS Schedule A limits in most instances. However, ozone exceeded the 1-hour averaging period limit under NS AAQS Schedule A (Table 7.4). This exceedance occurred in three separate instances between 2021 and 2025. The reported AQHI typically scores “low” for risk at all times of the year (ECCC, 2025a).

7.1.5 Effects Assessment

Project-Atmospheric Interactions

Project activities will interact with the atmospheric environment through fugitive dust and exhaust emissions from construction equipment (Table 7.5), primarily during the construction phase. There are no air emissions associated with the operation of a wind turbine. Furthermore, wind power generation will offset power production that would otherwise have come from fossil fuels.

Table 7.5: Potential Project-Atmospheric Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X

Project Phase	Potential for Interaction
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for the atmospheric environment is a 200 m buffer surrounding the Assessment Area (Drawing 7.2). This boundary is selected as it represents the distance beyond which effects to air quality are considered sufficiently diffused to no longer represent a potential impact to humans. The RAA is the same as the LAA.

Assessment Criteria

The assessment criteria provided in Section 4.3 apply to the atmospheric environment. The VC-specific definition for magnitude is as follows:

- Low: Air quality is expected to remain less than or equal to the maximum permissible ground-level concentrations as defined by the NSAQR.
- High: Air quality is expected to exceed the maximum permissible ground-level concentrations as defined by the NSAQR.

Effects

Fugitive dust emissions consist of particulate matter (PM) and may be generated from open-air activities (e.g., moving earth/disturbing soil, wind erosion, increased traffic). Fugitive dust emissions are composed mainly of soil minerals, but can also contain salt, pollen, spores, and tire particles. PM is measured as total suspended particulate (TSP), defined as the mass of airborne particles with diameters less than 100 µm. There are two forms of PM that pose the greatest concern for human health: PM with a diameter of 10 µm or less (PM₁₀) and PM_{2.5}.

Depending on its composition, concentration, and proximity to a human receptor, fugitive dust can affect lung and heart function when it enters the atmosphere. Particulate matter has been linked to premature death (people with lung and heart disease), non-fatal heart attacks, irregular heartbeat, aggravated asthma, decreased lung function, and increased respiratory symptoms such as irritation of the airways, coughing, or difficulty breathing. People with underlying lung and heart disease, children, and the elderly are the most susceptible to particulate pollution exposure (US EPA, 2024b).

Fugitive dust may also affect the environment by impairing visibility and causing environmental damage. Fine particles are the leading cause of reduced visibility in many cities, national parks, and wilderness areas. In addition, fugitive dust particles can be carried over long distances (via wind), deposited in other locations, and within surface water features. Some of the potential effects of particulate deposition may include the following (US EPA, 2024b):

- Increasing lake and stream acidity.
- Altering the nutrient balance in coastal waters and large river basins.
- Depleting the nutrients in the soil.
- Damaging sensitive forests and farm crops.
- A variety of effects on flora (described further in Section 10.1)
- Affecting the diversity of ecosystems.
- Contributing to acid rain effects.

Anticipated sources of fugitive dust emissions from the Project will be primarily associated with the construction of the Project and may include the following activities:

- Soil disturbance during site preparation (i.e., clearing/grubbing, grading, blasting).
- Wind erosion from soil or rock stockpiles during grading.
- Increase in traffic on roadways from travel by Project personnel (to/from the site).
- Management of on-site materials transfers (i.e., loading/unloading).

To assess the potential effects of fugitive dust emissions, potential receptors were identified as described in Section 4.1.5 and the potential for interactions with these emissions was evaluated. The travel distance of fugitive dust is influenced by several factors, including the height at which the dust is released, wind conditions, and particle size. Under most standard conditions, fugitive dust above 30 µm settles out within 100 m of the emission source. Other finer particles have a slower settling velocity and may travel further (US EPA, 1995). The LAA is well vegetated, which will likely help to reduce the travel distance of fugitive dust emissions from the Assessment Area (US EPA, 2014).

Five non-participating receptors are located within the LAA, none of which are within 100 m of the Assessment Area, where the greatest amount of fugitive emissions is anticipated to be generated. A single non-participating receptor within the LAA (GR) is located approximately 50 m from the provincial collector highway, Highway 316 (Marine Drive). Where Marine Drive is a paved road, frequented by other traffic, fugitive emissions effects are anticipated to be minimal and below the NSAQR.

In addition to fugitive dust, construction may increase combustion residuals and/or exhaust tailpipe emissions, primarily PM, NO_x, SO₂, and CO from vehicles (i.e., travel by Project personnel, transport/delivery activities) and heavy equipment. Exhaust emissions are primarily anticipated to be associated with road construction and upgrades within the Project Footprint. The United States Environmental Protection Agency (2014) determined that most roadway emissions are contained within the first 200 m from the emission source. Potential receptor,

EV, is within 200 m of a new Project road (though beyond 100 m), in addition to GR located near Marine Drive. Exhaust emissions may impact these receptors within the LAA; however, impacts will be temporary, and mitigations will be applied as required.

Mitigation Measures

Measures to minimize and mitigate the creation and emission of pollutants, including fugitive dust and exhaust emissions, will be implemented for the Project (particularly for the construction phase). General mitigation measures for fugitive (dust) emissions include:

- Minimize the footprint of disturbance to the extent practicable.
- Conduct grading and site preparation in phases to minimize disturbed soil areas until nearing construction activities.
- Stabilize exposed soil surfaces by sloping.
- Compact and/or ridge disturbed soil to prevent dust formation.
- Wet aggregate and soil stockpiles to control dust, as required.
- Design storage areas and material stockpiles with prevailing wind directions in mind.
- Wet roadways and heavy traffic areas with water or other approved dust suppressant technologies to minimize airborne emissions, as required.
- Post and maintain speed limits for on-site transportation and mobile equipment.
- Tie down, cover, and/or store loose site materials and/or products prior to inclement weather and wind events to prevent materials from becoming airborne.
- Wash down vehicles and equipment using hoses and water to remove accumulated mud/dirt on undercarriages, tracks, or wheel wells.
- Require that Project personnel adhere to all safety protocols and wear appropriate personal protective equipment (PPE) in the event of significant fugitive emissions events (i.e., windstorms, dust storms).
- Develop and implement an Erosion and Sedimentation Control Plan.

General mitigation measures for exhaust emissions include:

- Require that equipment meets all applicable provincial and air quality regulations and emissions standards.
- Maintain engines and exhaust systems according to the manufacturer's specifications and the recommended maintenance schedule.
- Remove from service malfunctioning equipment and/or equipment generating excess amounts of smoke, odour, or noise until an assessment and necessary repairs can be completed.
- Remove from service construction equipment with improperly functioning emissions control systems.
- Restrict the idling of equipment where feasible.

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of the Project on the atmosphere and ambient air quality (after mitigation) are characterized in Table 7.6.

Table 7.6: Atmosphere and Air Quality Residual Effects

Effect Detail	Fugitive and Exhaust Emissions
Magnitude of Effect	Low: Fugitive and exhaust emissions are expected to remain below the maximum permissible ground-level concentrations.
Geographic Extent of Effect	200 m buffer of the Assessment Area
Frequency of Effect	Intermittent: Effects may occur during the Project's construction, operation, and decommissioning phases, but only intermittently.
Duration of Effect	Short Term: Effects are mainly confined to the construction and decommissioning phases.
Reversibility of Effect	Reversible
Significance Level	Not Significant
<u>Effects Assessment Ratings (Refer to Table 4.4 for definitions)</u> Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible	

7.2 Climate Change

The effects of the Project on climate change are addressed in terms of GHG emissions per NSECC's A Proponent's Guide to Environmental Assessment (2025a) and the Guide to Considering Climate Change in Project Development in Nova Scotia (2011d).

7.2.1 Overview

Climate change is a long-term alteration of weather patterns and conditions strongly impacted by changes in temperature and precipitation. Climate change typically involves changes in average conditions, as well as changes in variability. The main contributor to climate change is GHGs from anthropogenic sources. Since GHGs disrupt the natural heat transfer processes within the Earth's atmosphere, a build-up of these gases has enhanced the natural greenhouse effect. These human-induced enhancements are especially of concern since ongoing GHG emissions have the potential to warm the planet to levels that have yet to be experienced (ECCC, 2019d).

The effects of the Project on climate change are described in terms of GHG emissions from wind energy produced by the Project. The impacts of climate change on the Project are assessed separately under Section 14.1.

7.2.2 Regulatory Context

The climate change assessment considered the following Acts and Regulations:

- *Environment Act* (Nova Scotia, 1995b)
- *Greenhouse Gas Emissions Regulations* (Nova Scotia, 2009)
- *Environmental Goals and Sustainable Prosperity Act* (Nova Scotia, 2012)
- *Canadian Environmental Protection Act* (Canada, 1999)
 - *Passenger Automobile and Light Truck Greenhouse Gas Emission Regulations* (Canada, 2010)
 - *Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations* (Canada, 2013)
 - *Ozone-depleting Substances and Halocarbon Alternatives Regulations* (Canada, 2016)

7.2.3 Assessment Methodology

The objectives of this assessment include the following:

- Establish the sources of GHG contributions from the Project.
- Quantify baseline and Project-generated GHG emissions.
- Mitigate and minimize GHG generation from Project-related activities.

Sources of GHG emissions were identified through a review of Project phases, components, and equipment.

Project-generated GHGs were quantified in accordance with the specifications described in the International Standard ISO 14064 (2019), and using published values found in the literature (sources provided in applicable sections that follow) and emission factors published in the NSECC Standards for Quantification, Reporting, and Verification of Greenhouse Gas Emissions (2018).

The determination of climate change impacts was completed based on estimated construction impacts (e.g., shipments and materials) and the current Nova Scotia energy grid. Where detailed construction methodologies are not yet determined, reasonable estimates for construction materials, suppliers, and transportation distances were used. Furthermore, the Nova Scotia energy grid is expected to decarbonize to meet its net-zero emission targets. This will involve the development of additional renewable energy or low-carbon intensity electrical generation projects (NSECC, 2022b). These renewable energy targets were not included in the baseline GHG emission calculations. All emissions, unless otherwise stated, are reported in tonnes of carbon dioxide equivalent (tCO₂e).

7.2.4 Assessment Results

7.2.4.1 *Sources of Greenhouse Gas Emissions*

The main GHGs of concern include:

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Halocarbons
- Water vapour

GHGs may be natural or anthropogenic in origin, except halocarbons, which are human-made (ECCC, 2019a). The following subsections describe the GHGs and their contributors (sources) as anticipated during each Project phase. However, during the operations phase, GHG emissions will be limited to maintenance activities (e.g., transportation and materials). Where these activities are intermittent and short-term, the GHG contributions from operations are negligible and are not considered further.

Carbon Dioxide

The primary source of atmospheric CO₂ is burning carbon-containing fossil fuels (i.e., coal, oil, and natural gas) and deforestation/land clearing activities.

Site preparation and construction for the Project will include several activities that are likely to produce CO₂, including, but not limited to:

- Use of heavy equipment (excavators, dozers, cranes, etc.).
- Use of light-duty vehicles and equipment (pick-up trucks, light plants, generators, etc.).
- Land clearing, including the decay of cut foliage (which releases CO₂ slowly).
- Cement production heats limestone, which releases CO₂ (ECCC, 2019a).

Methane

Primary sources of anthropogenic CH₄ include landfills, sewage, and the incomplete combustion of fossil fuels with insufficient oxygen (ECCC, 2019a). The Project's construction phase requires different heavy- and light-duty equipment, contributing to CH₄ emissions. Overall, methane emissions are anticipated to be minimal and not considered further.

Nitrous Oxide

The primary sources of N₂O are related to the use of nitrogen-based synthetic fertilizers and manure. These sources have added significant amounts of reactive nitrogen to Earth's ecosystems. Other contributors include the release of N₂O into the atmosphere during the combustion of fossil fuels and biomass (e.g., trees or wood-based fuels) and from some industrial sources (ECCC, 2019a).

The Project's construction phase requires heavy- and light-duty equipment, which can contribute to N₂O emissions. Land restoration activities (i.e., fertilizers) following construction will also contribute to N₂O emissions. Overall, the production of N₂O in association with this Project is anticipated to be minimal, in relation to other sources of GHGs.

Halocarbons

Halocarbons are a group of synthetic chemicals containing a halogen group (e.g., fluorine, chlorine, and bromine) and carbon (ECCC, 2019a). They are typically used in refrigerants, fire-extinguishing agents, and solvents (ECCC, 2013). There are various industrial sources, but the main contributor is aluminum production (US EPA, 2024a).

During the construction phase, the primary source of halocarbon emissions will be associated with coolants in air conditioning units found in vehicles, portable construction buildings (i.e., trailers), and equipment. Fire-extinguishing agents (containing halocarbons) may also be used in the event of an emergency which requires a fire-fighting response. Overall, halocarbon use is anticipated to be minimal and not considered further.

Water Vapour

Water vapour is the most important naturally occurring GHG. Human activities do not directly influence the amount of water vapour in the atmosphere, as it is a function of the atmosphere's temperature. The atmosphere can hold about 7% more water vapour for every additional degree Celsius in air temperature. When the air becomes saturated with water vapour, the water vapour condenses and falls as rain or snow, leading to climate change effects (i.e., variances in weather patterns).

As climate-warming gases (i.e., CO₂, CH₄, N₂O) increase in the atmosphere, the temperature rise increases water evaporation from the Earth's surface and increases the atmospheric water vapour concentrations. This increased water vapour, in turn, amplifies the warming from the initial GHGs, causing the cycle to repeat and temperatures to keep rising (ECCC, 2019a).

Project activities contributing to GHG emissions are not anticipated to impact water vapour concentrations in the atmosphere.

7.2.4.2 Quantification of the GHG Baseline Conditions

The GHG baseline is a reference of sources, sinks (removing), and reservoirs (storing) occurring in the absence of the Project and is used to compare pre- and post-Project conditions. That said, the baseline determines the quantity of carbon dioxide equivalent (CO₂e) emitted from current electricity production methods for the same electrical capacity of the Project.

The baseline sources are related to emissions generated from electricity currently produced in Nova Scotia from coal, oil, natural gas, and wind. There are no sinks and reservoirs attributed to the baseline scenario.

The Project consists of up to 158 turbines capable of generating up to 1,264 MW of renewable energy. Based on the wind turbine design capacity and an anticipated net capacity for the Project, the Project will be capable of producing approximately 3,875,424 megawatt-hours per year (MWh/year). The Project's lifespan is estimated at a minimum of 35 years.

Quantifying GHGs in terms of tCO₂e requires using current electricity-generating practices. For the year 2025 (latest available data), electricity generated in Nova Scotia by NS Power (the leading producer) was produced from the following fuel sources (NSPI, 2026):

- Coal (38%)
- Natural Gas (12%)
- Wind (16%)
- Renewable Imports (19%)
- Hydro (6%)
- Non-Renewable Imports (3%)
- Biomass (3%)
- Oil (2%)
- Other Renewables (1%)

A large amount of electricity generated for use in Nova Scotia comes from coal, natural gas, and oil, cumulatively accounting for 52% of the energy mix. Renewable sources (biomass, wind, renewable imports, hydro) account for 45%, and the remaining 3% consists of non-renewable imports.

For the purpose of this assessment, the non-renewable energy imports are distributed amongst coal (+1%), natural gas (+1%), and oil (+1%). Therefore, the fractions used for this assessment were coal at 39%, natural gas at 13%, and oil at 3%. Renewable energy (locally sourced and imported) was lumped together, and for this assessment, renewables were considered as wind energy at 45%.

Table 7.7 summarizes the GHG emission factors for the different types of electricity generated in Nova Scotia.

Table 7.7: Electricity Fuel Source Emission Factors

Electricity Fuel Source	Emission Factor (tCO ₂ e/kWh)
Coal	0.00105
Natural Gas	0.00044
Oil	0.00111
Wind	0

Source: (EIA, 2023)

Given the current electricity generation methods and the fuel source emission factors (Table 7.7), Table 7.8 summarizes the baseline GHG emissions. Baseline emissions are defined here as the quantity of CO₂e emitted from the current electrical grid for the same electrical generating capacity as the Project.

Table 7.8: Baseline Quantification Summary

Electricity Fuel Source	Electricity Generation (kWh/year)	Emissions (tCO ₂ e/year)
Coal	1,511,415,360	1,587,274.81
Natural Gas	503,805,120	220,372.18
Oil	116,262,720	128,918.19
Wind	1,743,940,800	0
Total	3,875,424,000	1,936,565.18

The total calculated annual GHG emissions generated in Nova Scotia for the same electrical capacity as the Project (based on 2025 data) is **1,936,565.18 tCO₂e**.

Detailed CO₂e calculations are provided in Table 1 (Appendix D).

7.2.4.3 Quantification of GHG Emissions – Construction Phase

Access Roads

The construction of new roads and the upgrading of existing roads will require the removal of vegetation and overburden, which will create fugitive dust and GHG emissions. However, where fugitive dust and GHG contributions for these activities are temporary, short-term, and represent a small incremental addition compared to the overall Project emissions, they were not quantified.

Section 7.1 (Atmosphere and Air Quality) discusses fugitive dust and air emissions as they relate to the Project.

Temporary Laydown Areas and Turbine Pads

Temporary laydown areas are intended to store equipment temporarily. The turbine pad area will include the foundation, crane pad, and area to lay out turbine components prior to construction. These areas will be prepared by removing vegetation and overburden and placing competent soils. Construction activities and equipment associated with the laydown areas and turbine pads are anticipated to create fugitive dust and GHG emissions. However, where fugitive dust and GHG contributions for these activities are temporary, short-term, and represent a small incremental addition compared to the overall Project emissions, they were not quantified. Additionally, a vegetation management plan (as part of the Terrestrial Habitat and Wildlife Management Plan) will be initiated to recover the lost flora and reduce dust resuspension while maintaining access and clearances to the turbine.

Turbine Foundation

A concrete tower foundation and pedestal will be required for each wind turbine. As such, the Project will require a large quantity of concrete to be produced and delivered to each wind turbine location.

The Proponent provided the anticipated materials to construct each tower foundation, which include 905 cubic metres (m³) of concrete and 81 tonnes of steel (rebar), per turbine foundation. Note that these suppliers have not been procured at this stage of the Project; as such, for the purpose of this assessment, transportation distances are based on the nearest known concrete and steel suppliers, which are both approximately 68 km from the Study Area. The quantification of the GHG emissions requires the following inputs:

- The vehicle size and fuel type used to transport the concrete.
- The distance travelled to and from the concrete manufacturer to the wind turbine sites.
- The freight and weight associated with each trip (to and from each turbine location).
- The quantity of concrete and steel produced for the wind turbine bases.

Heavy-duty diesel concrete trucks and heavy-duty haulers will be required to transport concrete and steel to the Study Area. Given that the turbine locations are scattered across the Study Area, transportation distances range from approximately 71 km to 106 km.

It is assumed that each concrete truck will carry approximately 20 tonnes (9 m³)⁽¹⁾ of concrete per delivery for a total of 2,036 tonnes of concrete per wind turbine. Similarly, it is assumed that each heavy hauler would carry no more than 38 tonnes of steel per truck, for a total of three trucks per turbine pad. With 101 truckloads of concrete and three truckloads of steel per wind turbine, the total one-way distance travelled is approximately 1,414,505 km and 42,015 km, respectively. GHG quantification considered travel to and from the nearest concrete and steel suppliers to the wind turbine locations.

Table 7.9 summarizes the GHG emission factors for the different components used for concrete- and steel-related activities.

Table 7.9: Concrete Manufacturing and Transportation Emission Factors

Component	Emission Factor
Concrete Production	3x10 ⁻⁴ tCO ₂ e/kg
Concrete Truck/Heavy Duty Truck (Diesel) with Freight	1.35x10 ⁻⁴ tCO ₂ e/tonne-km
Concrete Truck/Heavy Duty Truck (Diesel) without Freight	1.106x10 ⁻³ tCO ₂ e/km
General Steel Production	1.5 tCO ₂ e/tonne

Source: (Hammond & Jones, 2011; Squared Consultants Inc, 2025)

$$1 \frac{2,036 \text{ Tonnes of Concrete}}{\text{Turbine}} \div 20.2 \frac{\text{Tonnes of Concrete}}{\text{Truck}} = 101 \frac{\text{Trucks}}{\text{Turbine}}$$

Given the travelling distances, the quantity of concrete and steel required for the Project, and the emission factors (Table 7.9), the CO₂e emissions for constructing all the tower foundations and pedestals are expected to be approximately **121,408.51 tCO₂e**.

Detailed CO₂e calculations are provided in Table 2 (Appendix D).

Turbine Production

For the purposes of this EA, the Proponent has selected the Goldwind GWH182-8.0 MW turbine.

Goldwind completed a life cycle assessment (LCA) of the GWH182-8.0 MW. The LCA was based on a construction scenario in Miombo, Tanzania, and included construction, transportation, and the baseline energy utility mixture from Tanzania. As such, only the upstream module of the LCA was used for this assessment, which focused on the production of the turbines within the Goldwind assembly factory, including waste material transport, recycling, and disposal.

The LCA determined that the production of the GWH182-8.0 MW turbines accounted for **2.35 grams of CO₂ equivalent per kilowatt-hour (gCO₂e/kWh)** (EPDItaly, 2025). Based on the anticipated net production capacity of the Project, the construction emissions for the turbines are anticipated to be **318,753.62 tCO₂e⁽²⁾** over the Project's life. Although there are some uncertainties regarding the assumptions used for the LCA and their applicability to this Project, it is expected that the larger size of the Project, compared to the LCA scenario, would lead to a conservative estimate of GHG emissions in this assessment.

To quantify GHG contributions from the transportation of these turbines from the Goldwind factory to the Project Footprint, the following items were assessed:

- The turbine transportation distances from the manufacturer to the intended wind turbine laydown.
- The vehicle size and fuel type used to transport the wind turbines.

For quantification purposes, the assessment assumed the following:

- Manufacturing Location: Goldwind, Dafeng District, Yancheng, Jiangsu Province, China
- Nearest Shipping Port: Dafeng Port, Dafeng District, Yancheng, Jiangsu Province, China
- Nearest Nova Scotia Shipping Port: Strait of Canso Superport, Mulgrave, Nova Scotia

² $3,875,424,000 \text{ kWh} \times 2.35 \frac{\text{gCO}_2\text{e}}{\text{kWh}} \times \frac{1.0 \times 10^{-6} \text{ tonnes}}{\text{g}} \times 35 \text{ years} = 318,753.62 \text{ tCO}_2\text{e}$

The Goldwind GWH182-8.0 wind turbine consists of 13 principal components:

- Blades (3)
- Gearbox/Generator and Main Shaft (2)
- Hub (1)
- Nacelle (1)
- Tower segments (6)

Project turbines are assumed to be manufactured at the Goldwind manufacturing facility in Dafeng District, Yancheng, Jiangsu Province, China. The turbines will travel to the Dafeng port in Dafeng District, Yancheng, Jiangsu Province, China, by heavy diesel hauler (transport), where they will be shipped via diesel cargo vessel to the Strait of Canso Superport, Mulgrave, Nova Scotia. Table 7.10 summarizes the transportation distances from the manufacturer to the Project.

Table 7.10: Wind Turbine Transportation Distances

Originating Destination	Final Destination	Distance (km)
Manufacturing Facility Dafeng District, Yancheng, Jiangsu Province, China	Dafeng Port, Dafeng District, Yancheng, Jiangsu Province, China	63 (Land)
Dafeng Port, Dafeng District, Yancheng, Jiangsu Province, China	Strait of Canso Superport, Mulgrave, Nova Scotia	23,200 (Marine)
Strait of Canso Superport, Mulgrave, Nova Scotia	Ocean Lake Wind Project	Varied (Land)

To determine the travel distance for a wind turbine, the following assumptions were made:

- Each component will be individually transported via a single diesel heavy hauler.
 - 13 components per turbine to travel from the manufacturing facility in Dafeng District, Yancheng, Jiangsu Province, China, to the Dafeng Port in Dafeng.
 - 13 components per turbine to travel from the Strait of Canso Superport, Mulgrave Port, Nova Scotia, to the turbine location (distance will vary from one turbine location to another).
- Each wind turbine (in its entirety) will be transported via a single diesel cargo vessel (marine)

Based on the land distance from the manufacturer to the individual wind turbine location, the total land transportation distance (excluding marine transportation) is approximately **301,194 km**. The total marine transportation distance for transporting the wind turbines from China to the Strait of Canso Superport in Mulgrave, Nova Scotia, is approximately **3,665,600 km**. The distances travelled reflect travel only from the manufacturer to the Assessment Area; an equivalent return distance is not considered, as hauling companies have commitments to other clients, and those GHG emissions would not be attributable to the Project.

GHG emission factors for the different components of wind turbine transportation are provided in Table 7.11.

Table 7.11: Wind Turbine Transportation Emission Factors

Component	Emission Factor (tCO ₂ e/tonne·km)
Heavy Duty Truck (Diesel) with freight	1.35x10 ⁻⁴
Marine Cargo and Container Vessel (Diesel) with Freight	1.51x10 ⁻⁵

Source: (Squared Consultants Inc, 2025)

Given the land transportation distances required to deliver the wind turbines to the Project and the emission factors (Tables 7.10 and 7.11), the CO₂e emissions from land transportation are expected to be approximately **3,252.90 tCO₂e**. In addition, the marine transportation distances required to deliver the wind turbines from China to Canada will contribute **53,136.54 tCO₂e**.

Detailed CO₂e calculations are provided in Table 2 (Appendix D).

7.2.4.4 Operations Phase

Following the construction phase, the turbine will be operational, and the sinking of GHG emissions will begin. Based on the wind turbine design capacity, the Project will be capable of producing approximately 3,875,424,000 kWh/year. Therefore, the renewable energy produced will replace power production from fossil fuels and more intense generation methods described in the baseline conditions analysis.

According to Padey et al. (2012), maintenance activities are the only contributors of GHGs during the operations phase. The maintenance typically includes replacing approximately 15% of the nacelle components and one blade during the wind turbine's lifetime. According to a submission by Number Three Wind LLC (2018) to the New York State Department of Public Services, a wind turbine blade weighs 18,688 kg, while the nacelle weighs 76,204 kg. Assuming these components are fabricated of steel, the total emission from the replacement material for all the Project's wind turbines is **7,138.11 tCO₂e** (Appendix D).

7.2.5 Effects Assessment

Project-GHG Interactions

Project activities will emit GHGs during all phases of the Project (Table 7.12).

Table 7.12: Potential Project-GHG Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X

Project Phase	Potential for Interaction
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X (maintenance only)
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for GHG emissions is the province of Nova Scotia. The RAA for GHG emissions is the global environment.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply to Project-related GHG contributions. The VC-specific definition for magnitude is as follows:

- Positive: Project is expected to have a positive effect on GHG emissions.
- Negative: Project is expected to have a negative effect on GHG emissions.

Effects

The Project is intended to have a net positive effect on the GHG environment (Table 7.13).

Table 7.13: Project GHG Emission Summary

Component	Emissions (tCO ₂ e)
Baseline	
Electricity Generated from Coal	1,587,274.81 / year
Electricity Generated from Natural Gas	220,372.18 / year
Electricity Generated from Oil	128,918.19 / year
Electricity Generated from Wind	0
Total	1,936,565.18 / year
Construction Phase	
Foundation Production and Transportation	121,408.51
Wind Turbine Manufacturing	318,753.62
Wind Turbine Transportation	56,389.43
Total	496,551.56
Operations Phase	
Electricity Generated from Wind	0
Wind Turbine Maintenance	7,138.11 ⁽¹⁾
Total	7,138.11

⁽¹⁾Project lifespan emissions (single event)

The values in this table may differ from the values presented in Appendix D as a result of rounding errors; however, the rounding errors are negligible and do not change their representation.

As mentioned, the current GHG emissions for the quantity of electricity required by the Project using NS Power's conventional generation methods contribute to **1,936,565.18 tCO₂e** per year.

The Project's construction phase will generate the most GHGs from the manufacturing and transportation of the wind turbine, as well as the production and transport of concrete and steel for the tower foundation and pedestal. The total GHG emission contributions from the construction phase are **496,551.56 tCO₂e**.

The operations phase will generate GHGs from the wind turbines' maintenance (i.e., part replacements) as a one-time (Project lifespan) occurrence of **7,138.11 tCO₂e**.

Following the commissioning of the Project, the annual GHG emission reduction is expected to be **1,936,565.18 tCO₂e**. A one-time **7,138.11 tCO₂e** may be subtracted from any annual reduction; however, the annual reduction rate will be applied for the Project's lifespan (35+ years). The Project is anticipating a 0.26-year⁽³⁾ payback period to offset the construction-related GHG emissions. Following this period, the Project will positively offset GHG emissions that would typically be emitted from conventional production methods employed by NS Power.

$$3 \frac{\text{Construction Emissions}}{\text{Offset Emissions}} = \frac{496,551.56 \text{ tCO}_2\text{e}}{1,936,565.18 \text{ tCO}_2\text{e/year}} = 0.26 \text{ years}$$

The GHG emission reduction over the Project's lifespan (35 years) could be **67,276,341.82 tCO₂e**. Annual Project emissions reduction defaults to the same value for each year the Project is in operation (0% change in baseline and Project emissions). Emissions reductions are anticipated to change in any given year due to externalities such as changes to energy fuel sources, grid emissions factors, or others which may affect reductions resulting from the Project. The emission projections described in this assessment (annual and Project lifespan) do not consider the provincial commitment to removing coal from the energy grid by 2030 and for the provincial GHG emissions (including the grid) to be net-zero by 2050 (NSECC, 2022b). As such, this lifespan emissions reduction is an estimate of a best-case GHG reduction scenario over the lifetime of the Project.

The assumptions considered in this assessment propose a conservative estimate of GHG emissions, which may be lower if turbine and concrete manufacturer locations are closer to the Project and manufacturing materials are less than assumed. The use of a concrete batch plant would also significantly reduce GHG emissions during construction. Where assumptions may change the values provided in this assessment, the results remain constant; the Project will offset GHG emissions.

Mitigation Measures

Mitigation measures to reduce the Project's contributions to GHG emissions, reducing the overall impact on climate change, include:

- Use of locally sourced materials, where practicable, to reduce CO₂, CH₄, and N₂O emissions associated with transport.
- Incorporate the shortest construction/transport routes where practicable to minimize the use of fossil fuels during construction.
- Recover and recycle construction and demolition waste, where practicable.
- Minimize clearing to the greatest extent practicable.
- Site infrastructure in previously disturbed areas and use existing access roads to the extent practicable.
- Require Project equipment to meet all applicable provincial and air quality regulations and emissions standards.
- Require that engine and exhaust systems are maintained according to the manufacturer's specifications and applicable maintenance schedule.
- Remove malfunctioning equipment or equipment generating excess amounts of smoke, odour, or noise until an assessment and necessary repairs can be completed.
- Require construction equipment with an improperly functioning emission control system to not be operated.
- Require regular equipment maintenance to be undertaken to maintain good operations and fuel efficiency.
- Require preventative maintenance and inspections (e.g., leak testing) of equipment containing coolant (i.e., air conditioning units).
- Require equipment containing coolant (i.e., air conditioning units) to undergo preventative maintenance and inspections (i.e., leak testing).

- Dispose of halocarbon-containing substances at an approved hazardous waste facility per applicable regulations and in compliance with local requirements.
- Minimize idling to limit GHG emissions from vehicles and equipment and reduce the use of fossil fuels.

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of the Project on climate change (after mitigation) are characterized in Table 7.14.

Table 7.14: Climate Change Residual Effects

Effect Detail	Net Reduction of GHG Emissions
Magnitude of Effect	Positive: Net effect of the Project will be a reduction in GHG emissions.
Geographic Extent of Effect	Nova Scotia
Frequency of Effect	Continuous: Effects will occur continuously during operation.
Duration of Effect	Medium Term: Effects are expected throughout the operation phase.
Reversibility of Effect	Irreversible
Significance Level	Positive effect, significance not evaluated.
Effects Assessment Ratings (Refer to Table 4.4 for definitions)	
Magnitude: Negligible, Low, Moderate, High, Positive	
Frequency: Single Event, Intermittent, Continuous	
Duration: Short Term, Medium Term, Long Term	
Reversibility: Reversible, Irreversible, Partially Reversible	

7.3 Sound

7.3.1 Overview

The assessment of sound considered both construction and operational noise generated from the Project. During construction, heavy equipment, machinery, and light vehicles will emit sound to the surrounding environment from activities associated with the development of wind turbine pads, roads, along with the subsequent assembly and commissioning of wind turbines.

During the Project's operational phase, wind turbines will emit sound to the surrounding environment from mechanical equipment operation and the turbines' interaction with the surrounding air (aerodynamic sound). Detailed sound modelling was completed to quantify the potential impacts of turbine-generated noise on nearby receptors.

The WSP noise assessment (Appendix E) includes a qualitative assessment of potential construction noise and evaluation of operational noise emissions. The Project is being assessed as a wind development of up to 158 turbines. The current modelled layout includes 143 turbine locations (as noted in Drawing 2.1) using the Goldwind GWH182 8.0 MW turbine

model. Fifteen optional turbine locations are retained to preserve design flexibility during Project refinement, recognizing that final turbine selection may vary and advances in turbine sound emissions are expected at the time of construction. If any optional turbine location is advanced, the Proponent will complete updated sound modelling and confirm compliance with applicable thresholds before that location is finalized for construction.

7.3.2 Regulatory Context

Sound level thresholds are regulated through a variety of municipal and provincial regulatory instruments (Table 7.15).

As described in Section 3 of Appendix E, the framework for assessing noise impacts of proposed wind projects includes provincial guidance provided in the Environmental Assessment Supplemental Checklist: Wind Energy Projects [EA Guide (NSECC, 2025c)], and Guidelines for Environmental Noise Measurement and Assessment [GENMA (NSECC, 2023b)]. GENMA provides guidance on assessing low frequency noise as further described in Section 3.2 of Appendix E.

Municipal by-laws are generally established to protect the peace and tranquility of communities. For those referenced in Table 7.15, provisions are in place to permit construction activities during specific hours if a Building Permit has been issued.

Table 7.15: Summary of Sound Level Regulations and Guidelines

Regulated By	Regulation/Guidance	Permissible Sound Levels (dBA)	Hours / Duration
For Residential Receptors			
Construction Period			
MODG	MODG Noise Control By-Law (MODG, 2011)	≤ 65	06:00 to 23:00
		≤ 55	23:00 to 06:00
Operational Period			
NSECC	Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d)	≤ 40	During the operation of wind turbines at the exterior of a receptor
For Occupational Safety			
Workplace Health and Safety Regulations & Canadian Centre for Occupational Health and Safety	Noise – Occupational Exposure Limits in Canada (CCOHS, 2024)	85	8-hour maximum

7.3.3 Assessment Methodology

Construction Sound

The assessment of construction sound by WSP includes a discussion of expected noise sources and a qualitative assessment of potential effects to potential receptors (Section 6.3, Appendix E).

Operational Sound

The operational sound assessment conducted by WSP was completed through a combination of desktop studies and modelling per the NSECC Guidelines:

- The model's noise sources include:
 - 143 turbine locations using Goldwind GWH182 8.0 MW turbines with serrated trailing edge rotor blades and pad-mounted transformers. For clarity, 15 turbine locations (denoted as optional turbines [OT] in Drawing 2.1) have not been modelled for noise emissions.
- A Study Area for noise modelling was established as 2.1 km from all Project noise sources (Figure 1, Appendix E).
- Potential receptors within the 2.1 km buffer were assessed for cumulative noise levels (i.e., baseline sound plus Project-related sound).
- Baseline noise levels of 35 dBA were assumed at receptors following Health Canada and NSECC Guidance (Health Canada, 2023; NSECC, 2025d).
- Cumulative noise levels were calculated using CadnaA® modelling software which uses the ISO 9613-2 standard for calculating outdoor sound propagation.
- Modelled cumulative noise levels at potential receptors were evaluated for compliance, excluding participating landowners.

Additional noise assessment methodology is described in Section 4.3 of Appendix E.

7.3.4 Sound Assessment Results

A qualitative assessment of construction related sound was conducted by WSP (Section 6.3, Appendix E). As described in the WSP report, construction noise varies by activity and is generated primarily from vehicles, heavy machinery [e.g., backhoes, cranes, blasting (if required)], smaller equipment like welding tools, and backup alarms. Noise levels at nearby receptors depend on the number, type, and proximity of sources, and decrease with greater distance from the construction activity.

A total of 305 potential receptors were identified within 2.1 km of the selected turbine locations and substation. An additional 78 potential receptors within another 100 m of the 2 km buffer were included in the modelling in consideration of potential minor changes in turbine locations. Results of the sound modelling are shown on Figure 2 of Appendix E and detailed results and a compliance assessment are provided in Table 6 and 7 of Appendix E. All potential receptors were determined to comply with the NSECC guideline of 40 dBA.

Low frequency noise (LFN) modelling predicted no expected LFN issues following the GENMA methodology (NSECC, 2023b). Results of the LFN model are provided in Section 6.2 and Table 8 of Appendix E.

7.3.5 Effects Assessment

Project-Sound Interactions

Project activities will interact with the acoustic environment during all phases of the Project. Sound related to the decommissioning phase is not addressed separately because sound levels are expected to be comparable to construction levels (Table 7.16).

Table 7.16: Potential Project-Sound Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for sound includes a 2.1 km area around the selected turbine locations (Figure 1, Appendix E). The RAA is the same as the LAA.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for sound. The VC-specific definition for magnitude is provided for construction and operational sound as follows:

Construction Sound

- Low: Project activities to be completed in accordance with relevant MODG bylaws and permitting.
- High: Continuous noise generated from Project activities is predicted to exceed relevant MODG bylaws and permitting.

Operational Sound

- Low: Measurable sound levels predicted at the exterior of a potential receptor are below the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects (i.e., ≤ 40 dBA).
- High: Sound levels predicted to exceed the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects at the exterior of a potential receptor (i.e., > 40 dBA).

Effects

During construction of the Project, decibel limits above 55 dBA at residential receptors can result in disruptions of sleep during nighttime hours, while sounds above 65 dBA may cause annoyance and disturbance during daytime hours. Sounds produced during construction can exceed these thresholds at some residential receptors located within close proximity to planned construction activities. However, construction will be kept within allowable hours, based on local noise by-laws, and is considered a temporary source of noise generated by the Project. Activities producing higher levels of sound, such as blasting (if required), or handheld air tools, will be less frequent and last for a very short duration.

Modelled sound levels (ambient and generated sound) from the normal operating conditions of the 143 modeled turbine locations do not exceed 40 dBA at all potential receptors. Therefore, all potential receptors comply with the NSECC guidance for operational sound.

Mitigation Measures

As noted in Appendix E, the Proponent will implement the following measures to mitigate potential noise effects during Project construction, where practical:

- Conduct construction activities within acceptable timeframes per municipal bylaws.
- Advise nearby residents of noisy activities (e.g., blasting, if required) and schedule these activities to reduce disruption.
- Install appropriate and well-maintained muffler systems on engine-driven equipment.
- Design work areas and travel paths to reduce the amount of time that equipment must operate in reverse and thereby reduce the use of back-up alarms.

The Project will develop and implement a Complaint Resolution Plan, which will consider complaints related to sound and outline a process to investigate complaints. Mitigation to resolve complaints, if determined to be necessary, will be completed on a case-by-case basis in consultation with the affected complainant. If necessary, noise monitoring will be included as part of this process to evaluate ambient and operational noise in areas of concern.

Modelling will be updated prior to construction if there are changes to the layout, turbine model or specifications to ensure compliance with the Environmental Assessment Supplemental Checklist: Wind Energy Projects (Nova Scotia, 2025; NSECC, 2025c).

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of the Project on construction and operational noise (after mitigation) are characterized in Table 7.17.

Table 7.17: Sound Residual Effects

Effect Detail	Construction Noise	Operational Noise
Magnitude of Effect	Low: Construction activities are anticipated to comply with municipal by-laws and permitting.	Low: Operational sound is predicted to comply with the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects.
Geographic Extent of Effect	2.1 km buffer of noise sources	2.1 km buffer of noise sources
Frequency of Effect	Intermittent: Effects are anticipated during both the construction and decommissioning phases, and rarely during operation.	Continuous: Effects are anticipated throughout operations, although there may be temporary lapses during calm conditions while rotors are not spinning.
Duration of Effect	Short Term: Effects are expected throughout construction and decommissioning, but generally not during operations or after decommissioning.	Medium Term: Effects are expected throughout operations but will end at the start of decommissioning and will not continue.
Reversibility of Effect	Reversible	Reversible
Significance Level	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible		

7.4 Shadow Flicker

7.4.1 Overview

Shadow flicker can occur when rotating blades cast flickering shadows during times of direct sunlight. The magnitude of shadow flicker is determined by the position and height of the sun, wind speed and direction, geographical location, time of year, cloud cover, turbine hub height and rotor diameter, and proximity to the turbine.

For shadow flicker to occur, the following criteria must be met:

- The sun must be shining and not be obscured by clouds/fog.
- The source turbine must be operating.
- The wind turbine must be situated between the sun and the shadow receptor.
- The wind turbine must be facing directly towards, or away from, the sun such that the rotational plane of the blades (i.e., rotor plane) is perpendicular to the azimuth of incident sun rays. For this to occur, the wind direction would have to be parallel to the azimuth of the incident sun rays throughout the day.
- The line of sight between the turbine and the shadow receptor must be clear. Light-impermeable obstacles, such as vegetation, tall structures, etc., will prevent shadow flicker from occurring at the receptor.
- The receptor must be close enough to the turbine to be in the shadow.

The assessment of shadow flicker completed by WSP considers potential shadow flicker generated from the Project and effects on nearby receptors (as defined in Section 4.1.5). The Project is being assessed as a wind development of up to 158 turbines. The current modelled layout (Appendix F) includes 143 turbine locations (as noted in Drawing 2.1) using the Goldwind GWH182 8.0 MW turbine model. Fifteen optional turbine locations are retained to preserve design flexibility during Project refinement. If any optional turbine location is advanced, the Proponent will complete updated shadow flicker modelling and confirm compliance with applicable thresholds before that location is finalized for construction.

7.4.2 Regulatory Context

The Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d) requires that a receptor will not exceed 30 hours of shadow flicker per year or 30 minutes of shadow flicker per day.

7.4.3 Assessment Methodology

The shadow flicker assessment was completed through modelling to achieve the following objectives:

- Identify potential receptors that may experience shadow flicker from the Project's operation (see Section 4.1.5 for approach and receptor classification).
- Quantify the expected duration and frequency of shadow flicker for all potential receptors over a calendar year and during the modelled worst day.
- Assess if applicable guidelines are expected to be met, excluding participating landowners.

Potential receptors located within 2.1 km of the turbine locations were identified to assess the potential shadow flicker in the area (Figure 1, Appendix F).

As described in Section 3.4 of Appendix F, an analysis was conducted using the WindPRO v2.7 software package under "Worst-Case" modelling, which is the most conservative

approach and assumes that all the criteria listed in Section 7.4.1 are always met. “Worst-Case” modelling assumes conditions that are unlikely to occur in practice but provides a starting point for assessing potential shadow flicker issues.

A second modelling scenario was developed to account for more realistic conditions. The “Adjusted-Case” used the average monthly sunshine hours recorded at the closest weather station to the Study Area available in WindPRO, the Shearwater weather station (Table 3, Appendix F), for daily sunshine hours. In addition, the “Adjusted-Case” used historical wind direction data in WindPRO to estimate the probability of different wind directions and therefore, turbine orientation (Table 4, Appendix F).

The “Adjusted Case” is still conservative as it assumes that turbines are always active (i.e., turbine rotors are always turning), receptors are sensitive to shadow flicker in every direction (i.e., greenhouse mode) and does not account for screening of shadow flicker by vegetation, outbuildings or other structures (Section 7.4.1). The “Adjusted-Case” cannot predict adjusted maximum daily shadow flicker amounts because it is based on monthly average sunshine data; therefore, the maximum daily shadow flicker amounts are based on “Worst-Case” modelling.

7.4.4 Assessment Results

A total of 305 potential receptors were identified within 2 km of the selected turbine locations and substation. An additional 78 potential receptors within another 100 m of the 2 km buffer were included in the modelling in consideration of potential minor changes in turbine locations. (Section 3.2, Appendix F).

Detailed results are provided in Section 4.0 of Appendix F. A total of 27 potential receptors exceed 30 hours of shadow flicker per year and 39 potential receptors exceed 30 minutes of shadow flicker on the worst day under “Worst-Case” modelling (Table 6, Appendix F).

The “Adjusted-Case” was subsequently modelled using the weather data in Table 4 and 5 of Appendix F. The “Adjusted-Case” resulted all potential receptors complying with the guideline of 30 hours of shadow flicker per year (Table 5, Appendix F).

7.4.5 Effects Assessment

Project-Shadow Flicker Interactions

Project activities only interact with shadow flicker during wind turbine operations (Table 7.18).

Table 7.18: Potential Project-Shadow Flicker Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	-
Clearing and Grubbing	-

Project Phase	Potential for Interaction
Access Road Upgrading and Construction	-
Laydown Area and Turbine Pad Construction	-
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	-
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	-
Decommissioning	
Infrastructure Removal	-
Site Reclamation	-

Assessment Boundaries

The LAA for shadow flicker includes a 2.1 km buffer of selected turbine locations (Figure 1, Appendix F). The RAA is the same as the LAA.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for shadow flicker. The VC-specific definition for magnitude is as follows:

- Low: Measurable shadow flicker levels predicted at the exterior of receptors are below the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d).
- High: Measurable shadow flicker levels at receptors predicted to exceed the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects.

Effects

The “Adjusted-Case” predicts that all potential receptors will experience less than 30 hours of shadow flicker per year. The “Adjusted-Case” cannot predict adjusted maximum daily shadow flicker amounts because it is based on monthly average sunshine data. A total of 39 potential receptors were found to exceed 30 minutes of shadow flicker per day when modelled under “Worst-Case” conditions.

The “Adjusted-Case” is still considered a conservative assessment because it still assumes the following:

- Wind turbines are always in operation (i.e., rotors always spinning).
 - Wind turbines do not operate at all times, as rotor movement is dependent on suitable wind speeds and other operational factors.

- A clear line of sight, with no screening by trees, outbuildings, or other local structures.
- All receptors are sensitive to shadow flicker in every direction.

Mitigation Measures

The Proponent will develop a Complaint Resolution Plan, which will consider complaints related to shadow flicker and outline an investigation process. Mitigation to resolve complaints, if determined to be necessary, will be completed on a case-by-case basis in consultation with the affected complainant. This could include implementing an adaptive management schedule in Appendix F, as is determined to be necessary by the investigation and adapted to adjust for actual conditions experienced at the receptor.

Modelling will be updated if the turbine model or layout changes prior to construction to ensure compliance with the Environmental Assessment Supplemental Checklist: Wind Energy Projects (Nova Scotia, 2025; NSECC, 2025d).

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of Project-generated shadow flicker on non-participating receptors are characterized in Table 7.19.

Table 7.19: Shadow Flicker Residual Effects

Effect Detail	Shadow Flicker
Magnitude of Effect	Low: Measurable shadow flicker is expected but within regulatory compliance at non-participating receptors.
Geographic Extent of Effect	2.1 km buffer of turbine locations
Frequency of Effect	Intermittent: Effects may occur whenever the turbine rotors are spinning.
Duration of Effect	Medium Term: Effects are expected throughout the operational phase of the Project.
Reversibility of Effect	Reversible
Significance Level	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions)	
Magnitude: Negligible, Low, Moderate, High	
Frequency: Single Event, Intermittent, Continuous	
Duration: Short Term, Medium Term, Long Term	
Reversibility: Reversible, Irreversible, Partially Reversible	

8.0 GEOPHYSICAL ENVIRONMENT

8.1 Overview

The assessment of the geophysical environment included a review of topography, surficial geology, bedrock geology, and hydrogeology/groundwater.

8.2 Regulatory Context

Relevant legislation includes:

- *Environment Act* (Nova Scotia, 1995b)
- Sulphide Bearing Material Disposal Regulations (Nova Scotia, 1995d)

If blasting is required for construction, groundwater wells within 800 m must undergo an assessment in accordance with NSECC's Procedure for Conducting a Pre-Blast Survey (NSECC, 1993).

8.3 Assessment Methodology

The desktop assessment was completed through a review of the following resources:

- Aerial imagery and topography
- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Nova Scotia Geoscience Atlas (NSNR, 2021e)
- Mineral Resource Land-Use Atlas (NSNR, 2021b)
- Karst Risk Map (NSNR, 2019)
- Nova Scotia Groundwater Atlas (NSNR, 2024b)
- Manganese in Well Water Risk Map (Kennedy, 2021)
- Well Logs Database (NSECC & NSNR, 2022)
- Nova Scotia Pumping Test Database (NSNR, 2022b)
- Nova Scotia Groundwater Observation Well Network (NSECC, 2015a)
- Potential for Radon in Indoor Air (NSNR, 2009)

8.4 Assessment Results

Topography

The Study Area is located primarily within the Eastern Interior Ecodistrict (440), with the south and eastern sections within the Eastern Shore Ecodistrict (820), and a small northern section within the Mulgrave Plateau Ecodistrict (Drawing 7.1) (Neily et al., 2017).

The Eastern Interior Ecodistrict runs west from Pockwock Lake and extends east to Chedabucto Bay. This ecodistrict is the largest in the province. The ecodistrict consists of a rolling till plain with relatively gradual elevation changes, having a mean elevation of 95 m above sea level (masl). The Eastern Interior also has an upland terrain with concentrations of drumlins (Neily et al., 2017).

The Eastern Shore Ecodistrict extends from Chedabucto Bay to St. Margaret's Bay. The ecodistrict is narrow and topographically complex. Topography in this ecodistrict is rugged, with headlands and coastal peninsulas (Neily et al., 2017).

The Mulgrave Plateau Ecodistrict is a fairly flat till plain with gentle to moderate relief and an average elevation of about 130 m (Neily et al., 2017).

Within the Study Area specifically, elevations range from approximately 0.0 masl to 208.4 masl (Drawing 8.1).

Surficial Geology

Surficial geology of the Eastern Interior Ecodistrict consists predominantly of quartzite and slate tills of variable thickness. Within the Eastern Shore Ecodistrict, surficial geology is dominated by stony glacial till deposits that are frequently shallow to bedrock and interspersed with drumlin formations. The Mulgrave Plateau Ecodistrict consists of thin till deposits and can comprise slate and quartzite materials transported from neighbouring ecodistricts (Neily et al., 2017).

Within the Study Area specifically, surficial geology predominantly consists of a stony till plain of Quaternary age (Drawing 8.2). The plain consists of 2 m to 20 m of compact material derived from local sources, deposited at the base of melting ice sheets. These surficial features have high erodibility, rapid drainage, high water tables, and are shallow/stony, which can pose limitations for construction (NSNR, 2021e). Other surficial features present within the Study Area include:

- Exposed bedrock
- Hummocky ground moraine
- Marine deposits
- Kame fields and esker systems
- Organic deposits

Areas of exposed bedrock and/or bedrock overlain by a thin discontinuous layer of till were formed from glacial scouring, erosion, and/or non-deposition. These features are composed of various ages and types of bedrock and result in exposed ridges of hard rock (NSNR, 2021e).

Hummocky ground moraines are deposits of loose stony and sandy till that vary in thickness between 2 m and 25 m. These deposits are formed by the melting of stagnant ice sheets and result in irregular topography characterized by local ridges and depressions (NSNR, 2021e).

Marine deposits consist of gravel, sand, silt, and clay, and may be locally overlain by peat. The thickness of these deposits varies with depositional environment. Beach deposits typically range from approximately 2 m to 8 m, while salt marsh deposits are generally less than 2 m thick. These sediments are formed through coastal processes, including wave action, longshore currents, and tidal activity, which transport and deposit sediment along the shoreline and within low-lying coastal environments (NSNR, 2021e).

Kame fields and esker systems are glaciofluvial deposits which consist primarily of sand and gravel with minor silt and occasional diamicton layers. The deposits generally have a thickness of approximately 4 to 6 m; however, individual landforms may be thicker, with kames ranging from about 4 to 20 m, kame terraces from 3 to 30 m, and eskers commonly around 5 m in thickness. These materials are deposited by meltwater streams associated with glacial ice. Sediments accumulate in ice-contact environments, including within openings or depressions in the ice, along the margins of glaciers between the ice and valley slopes, or within subglacial meltwater tunnels, where flowing water deposits sand and gravel that later remain as ridges after the surrounding ice melts (NSNR, 2021e).

Organic deposits (i.e., wetlands/peatlands) develop because of topographic depressions collecting and/or storing surface water along with the infilling of ponds/watercourses with vegetation. Within the Study Area, the organic deposits range in depth from 1 m to 5 m (NSNR, 2021e).

Colluvial deposits (also known as talus slopes) are loose deposits of surficial material at the base of steep slopes. These geologic features can pose significant hazards as they are subject to sudden and rapid slides/failures. No records of colluvial deposits were identified within the Study Area (NSNR, 2021e).

Bedrock Geology

Bedrock within the Study Area consists of rocks from the Cambrian to Ordovician Halifax and Goldenville Formations, as well as intrusive Middle to Late Devonian muscovite biotite monzogranite (Drawing 8.3). The Halifax Formation is generally composed of slate, siltstone, and minor sandstone. The Goldenville formation includes rocks composed of metasandstone turbidities and minor slate (NSNR, 2021e).

Fault lines exist in the vicinity of the Study Area; however, Eastern Canada has a relatively low rate/risk of earthquake activity (NSNR, 2021e).

According to the Mineral Resource Land-Use Atlas, there are occurrences of sulphide-bearing slates in the Halifax Formation within the Study Area (NSNR, 2019). In addition, a review of the Nova Scotia Karst Risk Map (Drawing 8.4; based on provincial geology maps, sinkhole occurrence data, lidar data, and hydrogeological databases) indicated that the Study Area is within a "Low Risk" region (NSNR, 2019).

A total of 46 abandoned mine openings (AMOs) were identified within the Study Area. These AMOs represent former shafts, declines, pits, and trenches used to extract gold. While some of these AMOs are protected by signage and backfill, others are not. One of the identified AMOs is found within the Assessment Area (Shaft ID: SAN-1-004) and does not have a protection rating related to its safety status Drawing 8.3).

Nova Scotia has a history of environmental impacts from historic gold mines, including site contamination from mine tailings and concerns related to mercury and arsenic (NSECC, 2009b). No evidence of contamination is currently known, and therefore, no risk was evaluated.

As there is no indoor air pathway for radon gas, it is not considered a risk for the Project and was therefore not evaluated.

Groundwater Quality and Quantity

The Study Area is underlain by plutonic and metamorphic bedrock (NSNR, 2021e). Wells located in plutonic and metamorphic bedrock typically have higher dissolved solids and lower well water yields, as groundwater can flow only along fractures. Naturally occurring trace metals such as iron, arsenic, and manganese can be found in all groundwater regions, but are often associated with plutonic and metamorphic groundwater regions (Kennedy & Drage, 2009).

A review of the groundwater risk mapping indicated that the majority of the Study Area is located in a “High Risk” zone for arsenic, with some areas in the eastern portions of the Study Area categorized as “Medium Risk” (Drawing 8.5) (NSNR, 2021d). The Study Area is in a “High Risk” zone for manganese in well water, and “Medium Risk” within the eastern and northern sections of the Study Area (Drawing 8.6) (Kennedy, 2021). In addition, the Study Area is considered to have a predominantly “Low Risk” for uranium in groundwater, and “Medium Risk” in eastern and northern sections of the Study Area (Drawing 8.7) (NSNR, 2021d).

Groundwater Wells

An assessment of nearby groundwater wells was conducted using the NSECC Well Logs Database (NSECC & NSNR, 2022). This database contains records of well locations and characteristics within the province, dating back to approximately 1920. The database was reviewed to identify groundwater wells that may exist near the Study Area; however, there are significant limitations associated with the spatial accuracy of this database. For the purposes of this assessment, any groundwater wells that had a spatial uncertainty of greater than 1,000 m were not considered/assessed.

A total of 73 water wells were identified within 2 km of the Study Area using the NSECC Well Logs Database (NSECC & NSNR, 2022) (Drawing 8.5 to 8.7; Appendix G). Most wells identified are along Route 316 between Isaacs Harbour North and Larrys River, Nova Scotia. Additional wells are located off Larrys River Road from Larrys River to West Cooks Cove and off South River Lake Road between West Cooks Cove and West Roachville. A summary of well statistics is provided in Table 8.1.

Table 8.1: Summary of Water Well Records within 2 km of the Study Area

	Drilled Date (year)	Well Depth (m)	Bedrock Depth (m)	Static (m)	Yield (litres per minute)	Elevation (masl)
Minimum	1965	3.0	0.9	0.9	0.9	0.0
Maximum	2010	155.3	48.7	24.4	1,816.0	163.0
Average	N/A	46.3	7.7	5.5	70.5	34.6

Source: (NSECC & NSNR, 2022)

Six groundwater wells were identified within 800 m of the Assessment Area (where the greatest disturbance to the geophysical environment may occur). All six wells are drilled, four are used for domestic purposes, and the remaining two used for unknown purposes (Drawing 8.5 to 8.7). If blasting is required within 800 m of a well, the Proponent will conduct pre-blast surveys as per requirements under NSECC's Procedure for Conducting a Pre-Blast Survey (NSECC, 1993).

The NSNR Pumping Test Database provides long-term yields for select wells throughout the province and includes details on well construction and pumping tests, as well as interpreted hydrogeological properties. The nearest pumping test well (ID: 730360) is in Larrys River along Route 316, approximately 0.9 km from the Study Area. This well was drilled to a depth of 155.4 m below surface and had a static water level of 5.2 m and a safe long-term yield of 15 litres per minute (Lpm) (NSECC & NSNR, 2022).

NSECC maintains the Nova Scotia Groundwater Observation Well Network (NSECC, 2015a) to monitor groundwater levels, water quality, evaluate impacts of human activities, and evaluate long-term water trends. The nearest active provincial observation well to the Study Area is Stillwater (#055), located approximately 25.8 km west of the Study Area, near Stillwater and within the metamorphic groundwater region, which also underlies most of the Project. This well has been monitored since 1987, was drilled to a depth of 36 m through the Goldenville Formation and is currently active. In 2024, the average annual water level was 25.0 masl, and the annual water level fluctuation was approximately 1.3 m (NSECC, 2015a).

8.5 Effects Assessment

Project-Geophysical Interactions

Project activities will primarily interact with the geophysical environment during earthworks (Table 8.2).

Table 8.2: Potential Project-Geophysical Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-

Project Phase	Potential for Interaction
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	-
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for the geophysical environment is an 800 m buffer of the Project Footprint (Drawing 8.5 to 8.7). The RAA is the same as the LAA.

Assessment Criteria

The assessment criteria provided in Section 4.3 apply to the geophysical environment. The VC-specific definition for magnitude is as follows:

- Low: No geologic hazards are present within the Study Area; impacts to the quality/quantity of groundwater wells are not anticipated.
- Moderate: Risk mapping indicates a “Moderate” or “High Risk” of a geologic hazard(s) within the Study Area (or a known occurrence is identified) but the hazard(s) is anticipated to be mitigated with routine measures; impacts to the quality/quantity of groundwater wells are possible if blasting is required (wells are located within the LAA).
- High: Risk mapping indicates a “Moderate” or “High Risk” of a geologic hazard(s) within the Study Area (or a known occurrence is identified) which cannot be mitigated with routine measures; impacts to the quality/quantity of groundwater wells are anticipated if blasting is required (wells are located within the Project Footprint).

Effects

The geophysical environment will be disturbed within the Assessment Area during the site preparation and construction phase, and again during infrastructure removal and site reinstatement. During these phases, potential impacts related to the geological environment is primarily due to the presence and subsequent disturbance of geologic hazards, including:

- Sulphide-bearing slates (i.e., acid-generating rock)
- AMOs
- Arsenic, manganese, and/or uranium-containing bedrock

In Nova Scotia, several bedrock formations are known to contain acid-generating rock (sulphide minerals such as pyrite and pyrrhotite) that, when disturbed, can result in acid rock drainage (ARD). ARD occurs when sulphide-bearing rocks are disrupted and exposed to air or water, producing sulphuric acid and metal oxides that are subsequently mobilized/leached through freshwater systems (NSNR, 2021a). Based on provincial risk mapping, some sulphide-bearing slates are recorded within the Study Area (NSNR, 2021b). However, the

presence/absence of sulphide-bearing minerals and the likelihood of ARD will be confirmed following the results of the geotechnical evaluation.

Unsecured or poorly characterized AMOs pose potential risks to personnel, equipment, and ground stability. During construction, this could result in safety hazards such as ground collapse, subsidence, or accidental entry into concealed openings. Additionally, unforeseen mitigation measures (e.g., delineation, stabilization, or closure of the AMO) might be necessary.

Construction activities, primarily blasting (if required), can affect the quality and quantity of the surrounding groundwater supply, depending on proximity to drinking water wells and the extent of disturbance. Disturbance of arsenic-, manganese-, and/or uranium-containing bedrock can mobilize these metals in groundwater and subsequently degrade nearby groundwater well quality. Risk mapping shows the Study Area is primarily situated in a region that has “High Risk” and Medium Risk “ of arsenic and manganese containing bedrock, with areas of Medium Risk” and “Low Risk” for uranium in bedrock wells (Drawing 8.5 to 8.7) (Kennedy, 2021; Kennedy & Drage, 2020, 2017).

In addition to water quality, groundwater quantity may also be affected if blasting activities (as required) alter local hydrogeological flow regimes, causing groundwater to drain from or flow towards existing wells. As a result of potential impacts to groundwater quality and quantity, wells located within 800 m of blasting activities require monitoring per NSECC’s Procedure for Conducting a Pre-Blast Survey (NSECC, 1993). Based on the results of the desktop review, six wells are located within 800 m of the Assessment Area. Detailed characteristics of water wells identified within 2 km of the Study Area and wells located within 800 m of the Project Footprint are provided in Appendix G. The requirements for blasting and pre-blast surveys will be confirmed and further assessed during geotechnical investigations and detailed engineering design.

Potential impacts to nearby groundwater well quality because of arsenic, manganese, and uranium are not anticipated based on:

- Construction activities will primarily consist of clearing, grubbing, and grading within the surficial layer. Contact with/disturbance of groundwater is not anticipated from these activities.
- If blasting is required, blasting monitoring and mitigation plans will be developed, and regulatory guidelines will be adhered to.

Mitigation Measures

The following mitigation measures are recommended to minimize impacts to the geological environment:

- Limit the Project Footprint and disturbed areas to the extent practical.
- Use existing roads and site Project components in previously disturbed areas, where practicable.

- Conduct field investigations for the verification of unclassified AMOs prior to construction.
- Conduct blasting, if required, in accordance with provincial legislation and subject to the terms and conditions of applicable permits.
 - Conduct pre-blast surveys for wells within 800 m of blasting activities, which may include ground-truthing for nearby well locations.
 - If demonstrable changes in groundwater quantity or quality to a well are detected due to Project activities, an alternative water supply of equal or better quantity/quality than that impacted will be provided to the landowner.
 - Require that all blasts are conducted and monitored by certified professionals.
 - Notify landowners in advance of any blasting activities within 800 m.
- Assess for elevated sulphide potential in bedrock during pre-construction geotechnical surveys. If identified, develop a site-specific mitigation plan for sulphide-bearing materials in accordance with the Sulphide Bearing Material Disposal Regulations (Nova Scotia, 1995d) and in consultation with relevant regulatory departments.
- Store any soil needed for backfilling, after foundations have been poured, temporarily adjacent to the excavations until needed. Any remaining excavated material will be used on-site or removed.
- Install, monitor, and maintain erosion and sedimentation control measures as detailed in the Project Erosion and Sediment Control Plan.

Monitoring

If blasting activities are required to construct the Project (to be confirmed during geotechnical investigations), groundwater wells within 800 m of blasting activities will be monitored as per the Procedure for Conducting a Pre-Blast Survey (NSECC, 1993).

If geological hazards (ARD, etc.) are identified within the Project Footprint (and/or Study Area) during geotechnical investigations, a site-specific mitigation plan will be developed.

No additional monitoring programs are proposed at this time in relation to the geophysical environment.

Conclusion

The predicted residual effects of the Project on the geophysical environment (after mitigation) are characterized in Table 8.3.

Table 8.3: Geophysical Environment Residual Effects

Effect Detail	Encountered Geologic Hazard	Change to Groundwater Quality or Quantity
Magnitude of Effect	Moderate: Risk mapping shows the potential for geologic hazards in the Study Area.	Moderate: Groundwater wells located within 800 m of the Assessment Area.
Geographic Extent of Effect	800 m buffer of the Project Footprint.	800 m buffer of the Project Footprint.
Frequency of Effect	Continuous: If present, effects may occur continuously.	Intermittent: Effects may occur during blasting (if required).
Duration of Effect	Short Term: If present, effects limited to construction and decommissioning.	Short Term – Effects are possible throughout construction (if blasting is required).
Reversibility of Effect	Partially Reversible	Partially Reversible
Significance Level	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible		

9.0 AQUATIC ENVIRONMENT

9.1 Surface Water, Fish, and Fish Habitat

9.1.1 Overview

The objective of the aquatic assessment was to inform the Project's design and collect the information necessary to assess baseline biophysical data and potential impacts to surface water and fish and fish habitat, resulting from the Project. This was accomplished using the following approach:

- Identify surface water and fish and fish habitat within watercourses within the Study Area using desktop resources (Drawing 9.1 and 9.2).
- Identify representative habitats to survey for fish (Drawing 9.3A to 9.3Q).
- Traverse the Assessment Area to ground truth and delineate surface water features and provide characterization of any identified features (Drawing 9.3A to 9.3Q).
- Use the information collected to inform Project design (e.g., avoid/minimize impacts to surface water).
- Assess the quality of fish habitat within the Assessment Area via field surveys.
- Use the information collected to identify potential impacts and inform mitigation and management practices.

9.1.2 Regulatory Context

Under the *Environment Act* (Nova Scotia, 1995b), NSECC has the authority to promote the sustainable management of water resources in Nova Scotia. More specifically, as per Section 5A of the Activities Designation Regulations (Nova Scotia, 1995a), the alteration of a watercourse or the flow of water within a watercourse is an activity that requires an approval from NSECC, or a notification to NSECC if the work will be completed in accordance with the Nova Scotia Watercourse Alterations Standards (NSECC, 2015c).

The *Environment Act* (Nova Scotia, 1995b, Section 3be) defines a watercourse as:

- (i) the bed and shore of every river, stream, lake, creek, pond, spring, lagoon or other natural body of water, and the water therein, within the jurisdiction of the Province, whether it contains water or not, and
- (ii) all groundwater

Using this guidance, watercourses were identified and described throughout the Assessment Area to support the description of fish habitat, and effects to regulated watercourses which may require provincial approval. While groundwater is included in the regulatory definition of a watercourse under the *Environment Act* (Nova Scotia, 1995b), this section focuses on surface water features in the context of fish habitat. In addition to the above-mentioned definition, the watercourse parameters listed in the Guide to Altering Watercourses (NSECC, 2015b) were used to aid in determining the presence of a watercourse.

The *Fisheries Act* (Canada, 1985) is the primary federal legislation governing the conservation and protection of fish and fish habitat in Canada. The *Fisheries Act* prohibits any work, undertaking, or activity that results in the harmful alteration, disruption, or destruction (HADD) of fish or fish habitat, as well as the deposit of deleterious substances into waters frequented by fish, unless such activities are authorized through appropriate regulatory approvals. Under Section 35(2) of the *Fisheries Act*, authorization may be granted for a proposed work, undertaking or activity that may, respectively, result in the death of fish or the harmful alteration, disruption, or destruction of fish habitat.

The *Fisheries Act* defines the following:

Fish:

“(a) parts of fish, (b) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and (c) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals”

Fish Habitat:

“waters frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas”

If an alteration to a watercourse or waterbody is required, or impacts to fish and fish habitat are expected, a review under the DFO Request for Review process may be required. DFO review typically occurs through the provincial watercourse alteration application process.

Finally, species that are listed as Endangered or Threatened receive individual protection from harm and destruction under SARA and/or ESA.

9.1.3 Desktop Review

The objective of the desktop review was to identify potential fish communities, as well as watercourses and waterbodies located within the Study Area and within 5 km of its boundaries.

The desktop review included a query of the following resources and databases:

- CanVec Database – Hydrographic Features (NRCan, 2023)
- Significant Species and Habitats Database (NSNR, 2024d)
- Nova Scotia Topographic Database – Water Features (GeoNOVA, 2025)
- Wet Areas Mapping (WAM) (NSECC, 2022c)
- Nova Scotia 1:10,000 Primary Watersheds (NSECC, 2011a)
- 1:10,000 Secondary and Shore Direct Watershed of Nova Scotia (NSECC, 2011b)
- Aquatic Species at Risk Map (DFO, 2025a)
- Canadian Rivers Institute distribution (Gautreau & Curry, 2020)
- ACCDC Data Report (ACCDC, 2025b)

Surface Water

A review of the federal CanVec Database – Hydrographic Features (NRCan, 2023) identified 74 named and 128 unnamed waterbodies within the Study Area, along with 60 named and 166 unnamed waterbodies within 5 km. Ocean Lake, the largest waterbody in the Study Area (433.7 ha), is located in the central western portion of the Study Area. A complete list of named waterbodies within 5 km of the Study Area is provided in Table 9.1.

Table 9.1: Named Waterbodies Within 5 km of Study Area

Name of Waterbody	Distance
Waterbodies Within the Study Area	
Basin Lake	N/A
Bens Lake	N/A
Bears Big Lake	N/A
Bears Little Lake	N/A
Beech Hill Lake	N/A
Canter Lake	N/A
Cooper Shop Lake	N/A
Cranberry Lake	N/A
Cupboard Lake	N/A

Name of Waterbody	Distance
Donahue Lake	N/A
Double Farm Lake	N/A
Duck Lake	N/A
Ephraims Lake	N/A
First Lake	N/A
Fougère Lake (locally referred to as Farm Lake)	N/A
Fowlers Lake	N/A
Gaspereaux Lake	N/A
Glade Lake	N/A
Goal Lake	N/A
Gold Brook Lake	N/A
Goose Lake	N/A
Gores Lake	N/A
Green Barren Lake	N/A
Green Hill Lake	N/A
Gull Lake	N/A
Gull Lake	N/A
Hardwood Lake	N/A
Hay Lake	N/A
Henry Brook Third Lake	N/A
Henrys Lake	N/A
Horse Hill Ponds	N/A
Horseshoe Lake	N/A
Indian Man Lake	N/A
Jessies Lake	N/A
Johns Lake	N/A
Juniper Lake	N/A
Lac des Sauts	N/A
Last Lake	N/A
Lily Lake	N/A
Little Beech Hill Lake	N/A
Little Harbour Lake	N/A
Little Horseshoe Lake	N/A
Little Lake	N/A
Little Loon Lake	N/A
Long Lake	N/A

Name of Waterbody	Distance
Loon Lake	N/A
Lower Long Lake	N/A
Lower Wood Lake	N/A
Mark Lake	N/A
Moosehorn Lakes	N/A
North Lake	N/A
Northeast Branch Lake	N/A
Oak Hill Lake	N/A
Ocean Lake	N/A
Otter Lake	N/A
Pine Lake	N/A
Pipe Lake	N/A
Rocky Lake	N/A
Rocky Lakes	N/A
Rush Lake	N/A
Sangster Lake	N/A
Second Lake	N/A
Shoal Lake	N/A
Simons Lake	N/A
Sister Lakes	N/A
Square Lake	N/A
Sugar Valley Lake	N/A
The Three Ponds	N/A
Third Lake	N/A
Tom Lake	N/A
Trout Lake	N/A
Twin Lakes	N/A
Upper Long Lake	N/A
Upper Wood Lake	N/A
Waterbodies Within 5 km of Study Area ⁽¹⁾	
Angus Lakes	0.98
Back Pond	3.32
Barren Lake	0.45
Beach Ponds	2.95
Bills Lake	3.92
Black Lakes	3.51

Name of Waterbody	Distance
Black Ledge Pond	0.47
Bonnet Lake	1.7
Bordens Lake	3.62
Camp Lake	0.53
Cooks Lake	2.89
Crane Lake	0.06
Donahue Lake	0.29
Earls Lake	0.84
Eastern Pond	1.56
Eight Mile Lake	0.31
Elbow Lake	3.67
Five Island Lake	4.20
Fougère Lake	0.40
Frasers Lake	2.58
Garry Lakes	3.48
Grand Étang	1.41
Halfway Cove Lake	3.63
Henlines Lake	2.81
Henry Brook First Lake	0.23
Henry Brook Second Lake	0.29
Hydes Lake	1.68
Jakes Lakes	4.06
Jenkins Barren Pond	0.06
John Kirbys Lake	1.62
Johns Lake	2.75
Juniper Lake	2.32
La Trappe Lake	0.05
Lawlor Lake	0.68
Lily Pond	3.42
Little Lake	3.26
Long Pond	3.16
Meadow Lake	0.38
Middle Lake	2.46
Mill Dam Pond	4.23
Petitpas Lake	0.21
Pine Lake	0.08

Name of Waterbody	Distance
Poder Lake	1.71
Priest Lake	2.18
Rocky Lake	1.71
Round Lake	0.59
Rudder Lake	4.12
Sandy Cove Lakes	2.84
Seal Harbour Lake	0.24
Second Lake	3.49
Sheep Pen Pond	4.03
Skinner Lake	2.92
Sloans Pond	3.01
Southwest Cove Pond	4.63
Teal Pond	4.55
The Three Ponds	0.50
Three Corner Lake	0.01
Tom Lake	0.97
Western Big Lake	3.31
Western Pond	1.31

⁽¹⁾ Measurement from the nearest point of the Study Area.

A review of the Nova Scotia Topographic Database – Water Features (GeoNOVA, 2025) identified 714 watercourse feature segments within the Study Area and an additional 1,124 feature segments within 5 km of the Study Area. Of the 714 watercourse features within the Study Area, 12 are named: Basin Brook, Bettys Cove Brook, Cutler Brook, East Brook, Eastern Brook, Eastern Forks Stream, Gold Brook, Henry Brook, Larrys River, New Harbour River, and Northeast Branch New Harbour River (Drawing 9.1).

The majority of watercourses in the Study Area drain to the New Harbour/Salmon River Watershed (1EQ), which is comprised of 34 secondary watersheds, 12 of which intersect the Study Area. Out of these 12 secondary watersheds eight are Shore Direct and four are named: Salmon River (Guysborough County [1EQ-1]), Dickie Brook (1EQ-2), Larrys River (1EQ-3), and New Harbour River (1EQ-4) secondary watersheds.

The other primary watershed that intersects the Study Area is the Country Harbour River Watershed (1EP), which is comprised of 20 secondary watersheds, only one intersects the Study Area (Isaacs Harbour River [1EP-1] secondary watershed). Throughout the Study Area, WAM data indicates that groundwater ranges from 0 to 55.83 m (Drawing 9.2). WAM results generally aligned with the locations of watercourses identified using topographic mapping and highlighted the potential for additional watercourses throughout the Assessment Area (NSECC, 2022c).

Fish

The NSNR Significant Species and Habitat Database available on the Provincial Landscape Viewer (NSNR, 2024d) does not contain any polygons within the Study Area pertaining to aquatic freshwater and marine species.

The Aquatic Species at Risk Map (DFO, 2025a) is a federal database showing the distribution of SAR and their associated critical habitat within Canadian waters. Within the Study Area, the database identified no records of critical habitat; however, it did identify brook floater (*Alasmidonta varicosa*, S3) within a section of the Salmon River that is north of the Study Area within a 1 km buffer. It also identified six SAR/SOCI marine species within a 1 km buffer. The species found include fin whale (*Balaenoptera physalus*, S2S3), blue whale (*Balaenoptera musculus*, S1N), North Atlantic right whale (*Eubalaena glacialis*, S1), leatherback sea turtle (*Dermochelys coriacea*, S1,S2N), white shark (*Carcharodon carcharias*, SNRM), and Northern wolffish (*Anarhichas lupus*, SNR). As the species are outside of the inland Study Area, they would not interact with the Project and are only found within the marine environment; therefore, they are not discussed.

ACCDC Records

The ACCDC database identified one SAR [brook floater (*Alasmidonta varicosa*)] and four fish and aquatic invertebrate SOCI within 5 km of the Study Area (Drawing 9.1; Table 9.2). Additional aquatic species within 100 km of the Study Area are presented in the ACCDC report (Appendix H).

Table 9.2: Fish and Aquatic Invertebrate SAR/SOCI within a 5 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Fish					
American Eel	<i>Anguilla rostrata</i>	Threatened	-	-	S3N
Atlantic Salmon - NS Southern Upland pop.	<i>Salmo salar</i> pop. 6	Endangered	-	-	S1
Brook Trout	<i>Salvelinus fontinalis</i>	-	-	-	S3
Aquatic Invertebrates⁽¹⁾					
Brook Floater	<i>Alasmidonta varicosa</i>	Special Concern	Special Concern	Threatened	S3
Eastern Pearlshell	<i>Margaritifera margaritifera</i>	-	-	-	S2

Source: (ACCDC, 2025b)

⁽¹⁾ Invertebrates with at least one aquatic life stage brought forward (i.e., larvae, etc.)

9.1.4 Field Assessment

9.1.4.1 *Field Assessment Methodology*

The results of the desktop review were used to inform Project design (e.g., avoid/minimize impacts to waterbodies and watercourses). Given that the Project will avoid all waterbodies, field assessment efforts were focused on potential Project-watercourse interactions (i.e., intersections of access roads and watercourses where existing crossing structures may need replacement or new structures installed).

Watercourse Assessment

Watercourse delineations were completed in conjunction with wetland delineation during the summers of 2023 and 2024.

Desktop-identified watercourses, along with WAM data and predicted flow data, were provided to field staff to guide the identification and assessment of watercourses within the Assessment Area. Confirmed watercourses were delineated to their termination point or to the boundary of the Assessment Area. The watercourses were characterized using Strum's baseline delineation form, which records the following general survey details:

- Date and time
- Flow regime (perennial, intermittent, ephemeral)
- Habitat types (riffle, pool, run, etc.)
- Flow characteristics (direction, velocity, etc.)
- Physical characteristics (width, length, depth, entrenchment)
- Substrate composition
- Cover types and compositions
- Bank stability
- Photographs and coordinates

This information was collected and georeferenced using Survey123, an Environmental Systems Research Institute application for creating, sharing, and analyzing data. Watercourses were classified into four main types (Table 9.3), consistent with the definitions provided by Buttle et al. (2012).

Table 9.3: Watercourse Types

Watercourse Type	Channel Width	Channel Definition	Bed and Banks	Flow Seasonality
Large permanent	Average width approximately > 5 m	Defined channel	Defined bed and banks	Year-round flow
Small permanent	Average width approximately 2 m to 5 m	Defined channel	Defined bed and banks	Year-round flow

Watercourse Type	Channel Width	Channel Definition	Bed and Banks	Flow Seasonality
Intermittent	Average width approximately < 2 m	Defined channel	Defined bed and banks	Seasonal water flow
Ephemeral	No defined channel		No defined bed and banks	Seasonal water flow

In accordance with current regulatory guidelines, fish habitat was identified as any aquatic feature contiguous with a fish-bearing system, whether it is located within a watercourse, wetland, or waterbody. Where habitat was present within a channelized watercourse flowing through a wetland, it was assessed in the context of the watercourse. If habitat was located outside a defined channel, it was assessed in the context of the wetland, based on fish accessibility, or the presence of open water features. No waterbodies were assessed as none are present within the Assessment Area.

Predicted Watercourse Mapping

Drone assisted watercourse delineation was employed to identify predicted watercourses (PWC) within the Assessment Area where field delineation was not completed. Drone technology was used between June and October 2024 to survey and characterize watercourses that were inaccessible by foot or presented safety challenges. Drones were employed to provide a safe and efficient means of data collection, offering high-resolution imagery and facilitating the analysis of otherwise challenging terrain. Strum met with NSECC's surface water quality specialist on June 13, 2023, to present this approach.

Prior to conducting field surveys, a comprehensive flight plan was created using drone navigation software. This included defining the survey area, establishing optimal flight paths, and specifying the altitude for data acquisition to ensure full coverage of the watercourse and minimizing the risk of missing critical data points. Once the data was collected, orthomosaic maps were created with photogrammetry techniques, with an emphasis on correcting distortions and enhancing the overall quality of the dataset for subsequent analysis. Several indices were derived to assist with the analysis in addition to a canopy height model. The analysis with the drone data focuses on vegetation change, canopy height, inundated ground, and surface water detection to help identify watercourse features in the landscape.

Drone-derived data was then combined with other geospatial derivatives from hydrology workflows in GIS, including the integration of airborne LiDAR and terrain analysis, high resolution satellite imagery and ground-based measurements, to enhance overall understanding of the watercourse dynamics, ensuring a comprehensive characterization of the survey area. Once all the data was integrated, high-level characterizations and boundaries were inferred, providing a nuanced perspective on the features and connectivity of otherwise inaccessible wet areas.

Across various projects, Strum has observed drone surveys carried out using the methodology above to be a conservative assessment approach, typically yielding a slightly larger delineated area than what would be ground-truthed.

Electrofishing Survey

Electrofishing is a standard fish capture technique used to collect juvenile and adult fish from watercourses and waterbodies. The method involves submerging an anode and cathode in the water and passing an electrical current through the water to attract and immobilize fish for capture.

Electrofishing surveys were conducted in summer 2023 to assess fish species' presence and relative abundance. All surveys were conducted under DFO Scientific License # 360444.

DFO's Interim Policy for the Use of Backpack Electrofishing Units (DFO, 2003) was reviewed and followed by all members of the electrofishing crew. This policy outlines requirements for standard equipment, safety, training, and emergency procedures. Each crew consisted of two individuals, including a qualified crew lead as defined by the Policy. The crew lead is responsible for operating the backpack electrofisher according to their training and the Policy, and for communicating safety policies and electrofishing procedures to the crew member.

Fish sampling was conducted using a Smith-Root LR-20B electrofisher (or similar model) with un-pulsed direct current. A crew member walked alongside the electrofisher operator to net any stunned fish using a D-frame landing net (1/8" mesh). Captured fish were held in a live well containing ambient stream water, shaded from the sun, and regularly monitored for signs of stress. At the conclusion of each pass, fish in the live well were identified (species confirmation), photographed, and measured for length. After recuperating, all fish were released back into the watercourse. As part of the assessment, field staff made note of any fish observed but not caught, along with any points of concern such as obstructions to fish passage (e.g., elevated culverts, waterfalls, etc.).

Electrofishing was conducted concurrently with fish habitat assessments using a presence-absence approach. Surveys were completed along 100 m to 200 m reaches of selected watercourses within the Study Area. Target watercourses were identified based on field observations made in summer 2023, during watercourse delineation results, and through a desktop assessment. The desktop assessment was conducted on predicted Project intersections with watercourses on existing roads. This approach aligns with methods described in The Salmonid Field Protocols Handbook (Johnson et al., 2007), which cites multiple studies supporting the effectiveness of single-pass electrofishing for assessing species richness (Simonson & Lyons, 1995) and relative abundance (Kruse et al., 1998). Species abundance was estimated using catch per unit effort (CPUE) indices, standardized to 300 seconds of effort (Scruton & Gibson RJ, 1995). Prior to sampling, water temperature (< 22°C), potential of hydrogen (pH), and conductivity were measured using a water quality pen to confirm suitable conditions and minimize stress on captured fish.

Watercourses identified during desktop review for electrofishing surveys are as follows (Drawing 9.3A to 9.3Q):

- Site 1: Unnamed watercourse downstream of Cupboard Lake [New Harbour River secondary watershed (1EQ-4)]
- Site 2: Unnamed watercourse downstream of Cupboard Lake, upstream of confluence with Canters Lake outflow [New Harbour River secondary watershed (1EQ-4)]
- Site 3: Unnamed watercourse flowing out of Upper Long Lake into Lower Long Lake [Dickie Brook secondary watershed (1EQ-2)]
- Site 4: Cutler Brook [Dickie Brook secondary watershed (1EQ-2)]
- Site 5: Unnamed watercourse flowing out of Shoal Lake into Tom Lake [Dickie Brook secondary watershed (1EQ-2)]

These five locations were selected based on suitability of the habitat to conduct electrofishing surveys (i.e., deep enough to submerge the anode), location within secondary watersheds that intersect the Study Area, fish habitat potential, and access considerations. Fish species caught within these watercourses are assumed to be present upstream to the first or second order watercourses within the Study Area.

In-Situ Water Quality

Water quality parameters were measured in-situ during watercourse assessments and fish collection surveys by Strum personnel using a Hannah Combo pH/Conductivity/TDS Probe at the time of the sampling event/survey. Parameters recorded include water temperature (°C), pH, and conductivity [microsiemens per centimeter (µS/cm)]. Results were analyzed using the Canadian Council of Ministers of the Environment (CCME) Guidelines for the Protection of Freshwater Aquatic Life (FWALs).

9.1.4.2 Field Assessment Results

There were 99 watercourses identified within the Assessment Area during field assessments (Drawing 9.3A to 9.3Q): perennial (58), intermittent (39), and ephemeral (2) features ranging in channel width from 0.2 m to 23.5 m. Characteristics presented are limited to the extent of the watercourse contained within or overlapping the Assessment Area (Table 9.4). Representative photographs are provided in Appendix I.

Table 9.4: Watercourse Characteristics within the Assessment Area

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC1	Small Perennial	< 0.05	82	0.8-1.15	0.19-0.3	Dominant: Muck/Detritus Sub-dominant: Boulder, Cobble	Flat, Run	Moderate
WC2	Ephemeral	N/A	78	Watercourse flows underground				
WC3	Small Perennial	< 0.05	148	1.35-2.6	0.15-0.83	Dominant: Muck/Detritus	Flat	Moderate
WC4	Small Perennial	0.08-0.3	70	1.17-4.0	0.09-0.5	Dominant: Boulder Sub-dominant: Rubble, Muck/Detritus	Riffle, Run, Flat	Moderate
WC5	Large Perennial	0.6-1.06	78	3.4-4.4	0.11-0.59	Dominant: Boulder Sub-dominant: Rubble	Run	High
WC6	Small Perennial	0.07-0.4	49	0.53-1.39	0.02-0.21	Dominant: Muck/Detritus Sub-dominant: Cobble	Riffle, Flat	Low
WC7	Small Perennial	< 0.05	127	3.0-4.0	> 0.5	Dominant: Muck/Detritus	Flat, Pool	Low
WC8	Small Perennial	0.05-0.18	85	1.1-1.75	0.05-0.36	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Riffle, Flat	Moderate
WC9	Small Perennial	0.06-0.14	115	2.2-4.5	0.25-0.63	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble, Cobble	Riffle, Run, Flat	Moderate
WC10	Small Perennial	< 0.05	92	0.62-3.0	0.13-0.54	Dominant: Boulder Sub-dominant: Rubble, Cobble, Gravel, Muck/Detritus	Riffle, Flat	Moderate
WC11	Intermittent	< 0.05	63	0.77-1.23	0.03-0.25	Dominant: Muck/Detritus Sub-dominant: Gravel	Flat, Riffle, Pool	Moderate
WC12	Large Perennial	0.05-0.15	135	1.4-5.0	0.15-0.65	Dominant: Muck/Detritus Sub-dominant: Boulder	Riffle, Run, Flat	Low

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC13	Small Perennial	0.06-0.09	89	0.84-2.1	0.07-0.31	Dominant: Rubble Sub-dominant: Boulder, Cobble	Riffle, Run, Pool, Flat	High
WC14	Small Perennial	0.07-0.4	83	2.3-4.8	0.15-0.45	Dominant: Boulder Sub-dominant: Rubble	Riffle, Pool, Run	Moderate
WC15	Large perennial	0.09	261	4.8-10.0	0.11-0.29	Dominant: Boulder Sub-dominant: Rubble, Muck/Detritus	Riffle, Run	Moderate
WC16	Intermittent	0.07-0.4	283	1.7-2.8	0.08-0.23	Dominant: Cobble Sub-dominant: Boulder, Rubble	Riffle	Moderate
WC17	Intermittent	< 0.05	80	1.3--1.8	0.0-0.19	Dominant: Muck/Detritus Sub-dominant: Cobble	Riffle, Flat	High
WC18 ⁽¹⁾	Small Perennial	0.1-0.22	145	0.48-1.54	0.15-0.29	Dominant: Boulder Sub-dominant: Rubble, Sand	Riffle, Run, Pool	Moderate
WC19	Small Perennial	< 0.05	113	0.6-1.5	0.03-0.11	Dominant: Muck/Detritus Sub-dominant: Sand	Run	Low
WC20	Small Perennial	0.24-0.45	122	1.5-2.65	0.09-0.46	Dominant: Boulder Sub-dominant: Bedrock, Rubble	Riffle, Run	High
WC21	Intermittent	0.1-0.15	73	0.7-1.4	0.07-0.29	Dominant: Boulder Sub-dominant: Rubble, Cobble	Riffle, Flat	High
WC22 ⁽¹⁾	Small Perennial	0.1-0.45	167	0.07-0.1	0.3-1.7	Dominant: Rubble Sub-dominant: Cobble, Muck/Detritus	Riffle, Run, Pool	Moderate
WC23	Intermittent	< 0.05	78	0.6-1.1	0.01-0.11	Dominant: Muck/Detritus Sub-dominant: Boulder	Flat, Riffle, Pool	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC24	Small Perennial	0.05-0.09	85	0.11-0.81	0.5-4.0	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble, Gravel, Sand	Riffle, Run, Flat, Pool	Low
WC25	Intermittent	< 0.05	15	0.5-1.0	0.08-0.1	Dominant: Gravel Sub-dominant: Cobble	Riffle, Flat	High
WC26	Small Perennial	0.05-0.25	106	0.2-1.35	0.04-0.19	Dominant: Rubble Sub-dominant: Boulder	Riffle, Run	High
WC27	Small Perennial	< 0.05	27	0.65-2.06	0.03-0.08	Dominant: Silt Sub-dominant: Muck/Detritus	Run	Moderate
WC28	Intermittent	< 0.05	125	0.41-1.43	0.07-0.48	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Riffle, Run, Pool	Moderate
WC29	Small Perennial	0.07-0.15	332	1.5-3.5	0.01-0.13	Dominant: Gravel Sub-dominant: Boulder, Sand	Riffle, Cascade, Pool	High
WC30	Large Perennial	0.15-0.52	74	7.0-11.0	0.11-0.62	Dominant: Boulder Sub-dominant: Rubble, Cobble	Pool, Run, Flat, Rapids, Riffle	High
WC31	Small Perennial	< 0.05	47	0.4-0.65	0.0-0.16	Dominant: Muck/Detritus Sub-dominant: Gravel	Run	High
WC32	Small Perennial	< 0.05	115	0.9-1.2	0.03-0.18	Dominant: Muck/Detritus Sub-dominant: Sand	Flat, run	High
WC33	Small Perennial	0.15-0.25	89	1.0-2.5	0.03-0.63	Dominant: Boulder Sub-dominant: Rubble, Cobble	Riffle, Run, Rapids, Pool	High
WC34	Large Perennial	0.12-0.34	139	13.0-16.5	0.34-0.84	Dominant: Rubble Sub-dominant: Boulder, Cobble	Riffle, Run	High
WC35	Small Perennial	0.05-0.183	83	2.0-3.5	0.07-0.23	Dominant: Boulder Sub-dominant: Rubble, Cobble, Muck/Detritus	Flat, Riffle, Cascade	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC36	Small Perennial	0.07-0.19	109	1.8-2.02	0.02-0.6	Dominant: Rubble Sub-dominant: Cobble	Riffle, Run, Flat	High
WC37	Intermittent	< 0.05	100	0.5-1.0	0.01-0.1	Dominant: Gravel Sub-dominant: Boulder, Rubble	Pool, Riffle	Moderate
WC38	Large Perennial	0.24-0.5	104	5.5-10.5	0.17-0.56	Dominant: Gravel Sub-dominant: Rubble, Cobble, Boulder	Riffle, Run, Rapids	Moderate
WC39	Large Perennial	0.2	191	7.3-10.0	0.24-0.31	Dominant: Boulder Sub-dominant: Rubble	Run, Riffle, Pool	High
WC40	Small Perennial	0.5-0.07	90	0.56-1.82	0.01-0.35	Dominant: Muck/Detritus Sub-dominant: Boulder	Flat, Run, Riffle, Pool	High
WC41	Small Perennial	0.07-0.24	58	2.31-3.8	0.21-0.6	Dominant: Boulder Sub-dominant: rubble, Cobble, Gravel	Riffle, Run	High
WC42	Large Perennial	0.08-0.2	101	4.59-10.0	0.08-0.28	Dominant: Boulder Sub-dominant: Bedrock	Run, Riffle, Flat	High
WC43 ⁽¹⁾	Small Perennial	< 0.05	284	0.67-1.63	0.04-0.14	Dominant: Cobble Sub-dominant: Boulder	Flat, Pool	Moderate
WC44	Intermittent	0.05-0.12	168	2.13-7.0	0.07-0.35	Dominant: Boulder Sub-dominant: Rubble	Flat, Riffle	High
WC45	Large Perennial	0.02-0.67	71	10.2-23.5	0.13-0.8	Dominant: Boulder Sub-dominant: Rubble, Cobble, Muck/Detritus	Pool, Riffle, Run	High
WC46	Large Perennial	< 0.05	109	2.72-6.0	0.21-0.81	Dominant: Muck/Detritus Sub-dominant: Boulder	Flat, Riffle	High
WC47	Small Perennial	0.05-0.15	76	3.1-4.3	0.04-0.35	Dominant: Rubble Sub-dominant: Boulder	Riffle, Run	High
WC48	Intermittent	< 0.05	35	1.5-3.0	0.05-0.12	Dominant: Muck/Detritus Sub-dominant: Sand	Pool, Run, Riffle, Step Pool	High

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC49	Intermittent	< 0.05	44	0.9-1.7	0.06-0.17	Dominant: Muck/Detritus Sub-dominant: Cobble	Flat, Riffle	Moderate
WC50	Small Perennial	< 0.05	46	1.0-1.5	0.07-0.1	Dominant: Sand Sub-dominant: Gravel, Rubble	Riffle	High
WC51	Intermittent	< 0.05	80	0.7-1.45	0.05-0.36	Dominant: Muck/Detritus Sub-dominant: Cobble	Rifle, Run, Flat	Low
WC52	Intermittent	< 0.05	52	2.5-3.0	0.03-0.11	Dominant: Muck/Detritus Sub-dominant: Silt, Gravel, Rubble	Riffle, Run	Moderate
WC53	Intermittent	0.05-0.08	197	1.2-2.02	0.13-0.48	Dominant: Muck/Detritus Sub-dominant: boulder	Flat	Moderate
WC54	Intermittent	< 0.05	97	1.22-1.42	0.01-0.18	Dominant: Rubble Sub-dominant: Gravel, Rubble, Muck/Detritus	Riffle, Flat	Moderate
WC55	Small Perennial	0.15-0.33	76	1.2-1.4	0.06-0.13	Dominant: Rubble Sub-dominant: Boulder, Cobble	Riffle, Run	Moderate
WC56	Small Perennial	0.05-0.33	105	0.3-1.2	0.05-0.16	Dominant: Muck/Detritus Sub-dominant: Rubble, Cobble	Run	Moderate
WC57	Small Perennial	0.05-0.23	73	1.61-1.93	0.05-0.17	Dominant: Boulder Sub-dominant: Bedrock, Rubble, Gravel	Riffle, Pool	High
WC58	Intermittent	0.06-0.13	80	1.3-1.82	0.08-0.39	Dominant: Muck/Detritus Sub-dominant: Boulder	Riffle, Run	Moderate
WC59	Small Perennial	0.05-0.25	382	0.98-4.5	0.09-0.41	Dominant: Rubble Sub-dominant: Muck/Detritus	Riffle, Run, Flat	High

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC60	Small Perennial	0.15-0.37	78	1.5-3.35	0.16-0.5	Dominant: Rubble Sub-dominant: Muck/Detritus, Rubble	Riffle, Run	High
WC61	Intermittent	< 0.05	43	0.2-0.5	0.1-0.2	Dominant: Muck/Detritus	Run	Low
WC62	Intermittent	< 0.05	58	0.63-1.61	0.06-0.12	Dominant: Cobble Sub-dominant: Rubble, Sand, Gravel	Riffle, Pool, Run	High
WC63	Small Perennial	< 0.05	90	1.76-2.19	0.04-0.24	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble	Run, Flat	Moderate
WC64	Intermittent	0.12-0.25	73	0.78-0.9	0.1-0.25	Dominant: Muck/Detritus Sub-dominant: Cobble, Gravel	Riffle, Run	Moderate
WC65	Small Perennial	< 0.05	131	1.09-3.3	0.03-0.16	Dominant: Boulder Sub-dominant: Muck/Detritus	Flat, Run	High
WC66	Small Perennial	0.08-0.21	75	0.42-1.06	0.03-0.26	Dominant: Cobble Sub-dominant: Muck/Detritus	Riffle, Run, Flat	Low
WC67	Intermittent	< 0.05	179	0.75-1.75	0.12-0.26	Dominant: Muck/Detritus Sub-dominant: Boulder	Flat, Riffle, Pool	Moderate
WC68	Intermittent	0.05-0.27	75	0.68-0.88	0.12-0.24	Dominant: Cobble Sub-dominant: Muck/Detritus	Riffle, Pool	High
WC69	Intermittent	< 0.05	72	0.59-0.68	0.0-0.2	Dominant: Muck/Detritus Sub-dominant: Rubble	Pool, Flat	Moderate
WC71	Intermittent	< 0.05	309	1.0-8.0	0.48->1.0	Dominant: Muck/Detritus Sub-dominant: Cobble	Run	High
WC72	Intermittent	0.07-0.33	113	0.42-1.91	0.11-0.36	Dominant: Muck/Detritus Sub-dominant: Cobble	Run	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC73	Small Perennial	0.14-0.24	88	1.3-2.15	0.04-0.21	Dominant: Boulder Sub-dominant: Cobble, Muck/Detritus	Pool, Run	Moderate
WC74	Intermittent	0.1-0.4	81	1.06-2.6	0.08-0.21	Dominant: Sand Sub-dominant: Rubble, Cobble, Gravel	Run	Moderate
WC75	Intermittent	0.1-0.15	86	1.79-2.13	0.08-0.13	Dominant: Gravel Sub-dominant: Boulder, Rubble, Cobble	Riffle, Run, Rapids	Moderate
WC76	Small Perennial	0.1-0.27	115	1.37-2.5	0.17-0.47	Dominant: Boulder Sub-dominant: Cobble, Gravel	Riffle, Run, Flat	High
WC77	Intermittent	0.05-0.25	75	0.71-1.62	0.03-0.29	Dominant: Boulder Sub-dominant: Muck/Detritus, Rubble	Run, Flat, Pool, Riffle	Moderate
WC78	Small Perennial	0.07-0.19	77	1.2-2.84	0.07-0.3	Dominant: Boulder Sub-dominant: Rubble, Cobble, Sand	Riffle, Run	Moderate
WC79	Small Perennial	0.2-0.33	79	0.45-0.8	0.1-0.4	Dominant: Rubble Sub-dominant: Cobble, Gravel, Muck/Detritus	Run, Riffle, Flat	Moderate
WC80	Small Perennial	0.2	78	0.3-0.7	0.1-0.3	Dominant: Cobble Sub-dominant: Boulder, Rubble, Gravel	Run, Riffle, Flat	Moderate
WC81	Intermittent	< 0.05	175	0.5-1.25	0.01-0.2	Dominant: Muck/Detritus Sub-dominant: Boulder, Clay	Pool, Run	Low
WC82	Small Perennial	0.05-0.137	101	2.1-4.1	0.08-0.41	Dominant: Muck/Detritus Sub-dominant: Boulder, Rubble	Pool, Run	Moderate

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC83	Intermittent	< 0.05	281	0.48-0.87	0.14-0.21	Dominant: Boulder Sub-dominant: Gravel	Pool	Moderate
WC84	Intermittent	< 0.05	48	0.62-0.84	0.0-0.17	Dominant: Muck/Detritus	Flat	Low
WC85	Ephemeral	< 0.05	43	0.35-0.65	0.06-0.2	Dominant: Rubble Sub-dominant: Muck/Detritus	Riffle, Run, Flat	Moderate
WC86	Intermittent	< 0.05	92	1.2-2.7	0.15-0.45	Dominant: Boulder Sub-dominant: Muck/Detritus	Riffle, Run, Flat	Moderate
WC87	Small Perennial	0.1	76	4.5-6.8	0.05-0.51	Dominant: Boulder Sub-dominant: Rubble, Bedrock	Run, Riffle, Flat	High
WC89	Small Perennial	0.07-0.12	112	1.68-3.7	0.09-0.17	Dominant: Boulder Sub-dominant: Cobble, Rubble	Riffle, Run	High
WC90	Intermittent	0.09-0.25	42	0.65-3.4	0.01-0.07	Dominant: Cobble Sub-dominant: Cobble, Rubble	Run	High
WC91	Intermittent	0.05-0.15	52	1.4-1.65	0.1-0.26	Dominant: Rubble Sub-dominant: Boulder, Gravel	Riffle, Run, Pool	Moderate
WC92	Small Perennial	< 0.05	89	0.96-3.0	0.08-0.19	Dominant: Muck/Detritus Sub-dominant: Boulder	Flat	High
WC93	Small Perennial	< 0.05	48	0.52-2.2	0.01-0.26	Dominant: Muck/Detritus Sub-dominant: Gravel, Silt	Flat, Riffle, Run, Pool	Moderate
WC94	Intermittent	< 0.05	83	0.5-2.1	0.07-0.42	Dominant: Muck/Detritus	Flat	High
WC95	Intermittent	0.05-0.1	399	0.2-0.92	0.03-0.45	Dominant: Muck/Detritus Sub-dominant: Gravel, Boulder	Flat, Riffle	Moderate
WC96	Intermittent	< 0.05	175	1.6-2.0	0.11-0.26	Dominant: Muck/Detritus	Flat	Low

WC ID	Flow	Velocity (m/s)	Length (m)	Channel Width Range (m)	Depth (m) Range	Substrate	Habitat Types	Bank Stability
WC97	Small Perennial	< 0.05	656	12-15	> 1.0	Dominant: Muck/Detritus	Flat	Low
WC98	Intermittent	< 0.05	104	0.45-1.2	0.02-0.31	Dominant: Rubble Sub-dominant: Boulder, Cobble	Run, Rapids, Riffle	Moderate
WC99	Small Perennial	< 0.05	88	0.53-1.19	0.03-0.13	Dominant: Muck/Detritus	Flat	Moderate

⁽¹⁾Two separate watercourses delineated together, watercourses contain similar characteristics.

⁽²⁾Error with field forms resulted in the loss of WC70 and WC88 field forms. The watercourses were still delineated in the field.

Perennial or permanent features see flow for the majority, if not the entirety of the year. Their continuous flow is often attributed to their direct connection to stable sources of water, including lakes and groundwater springs (US EPA, 2013). Small permanent features include streams, brooks, and creeks. These features are often first- and second-order streams fed by springs, groundwater, and run-off, and often act as tributaries to larger features, creating larger permanent features at their confluence. Large permanent features often exhibit lower flow path gradients, larger channel dimensions, and an increased flow (US EPA, 2013). A total of 58 watercourses were categorized as perennial.

Flow in intermittent watercourse features can vary throughout the year, either due to changes in their water source in other abiotic factors such as temperature or geological properties (Buttle et al., 2012). Intermittent watercourses are often first- and second-order streams fed by lakes, wetlands, springs, groundwater, and run-off. They are often episodic and flow more prominently following rainfall events and snowmelt conditions. Intermittent flow can occur underground as well as above the water table, along the surface. These features also differ in that they can observe partial channelization but will often enter below the surface (Buttle et al., 2012). A total of 39 watercourses were categorized as intermittent.

Ephemeral features are often surface water flows and only present following snowmelt periods or rainfall events. These conditions are the sole sources of stream flow present in many of these features and as a result, their flow is always observed above the water table near the surface. In Nova Scotia, and within the Study Area, ephemeral conditions can also be observed between and within wetlands, which are sometimes referred to as wetland corridors. Two watercourses were categorized as ephemeral.

Several of the identified watercourses within the Assessment Area showed evidence of alteration resulting from anthropogenic development activities throughout the last century. For example, some watercourses have been disrupted through the installation of culverts to facilitate forestry activities and other land uses within the Study Area. Forestry activities have also indirectly impacted watercourses through a decrease in evapotranspiration, a decrease in shaded areas, and an increased displacement of organic material and sediment through surface erosion and overland flow.

Predicted Watercourse Mapping

Drone-assisted watercourse mapping identified 50 PWCs either partially or fully within the Assessment Area (Drawing 9.3A to 9.3Q) including, intermittent (19), small permanent (29), and large permanent (2) watercourses. Any PWCs determined to be impacted by the Project will be ground-truthed for boundaries, characteristics, and functionality prior to any alterations.

Electrofishing Surveys

Qualitative electrofishing was conducted on five watercourses during summer 2023 by qualified Strum field staff (Table 9.5; Drawing 9.3A to 9.3Q).

Table 9.5: Electrofishing Survey Results

Site	Secondary Watershed	Survey Date	Coordinates (UTM)		Fish Species Collected						Electrofishing Effort (Seconds)	Catch Per Species	Total Catch
			Easting	Northing	Common Name	Scientific Name	SARA	COSEWIC	ESA	S-Rank			
Site 1 ⁽¹⁾	New Harbour River Secondary Watershed (1EQ-4)	July 6, 2023	617455	5014472	Brook Trout	<i>Salvelinus fontinalis</i>	-	-	-	S3	1095	5	5
					American Eel	<i>Anguilla rostrata</i>	-	Threatened	-	S3N	753	1	7
					Brook Trout	<i>Salvelinus fontinalis</i>	-	-	-	S3		6	
Site 2		July 7, 2023	618383	5012496	American Eel	<i>Anguilla rostrata</i>	-	Threatened	-	S3N	1267	4	5
					Brook Trout	<i>Salvelinus fontinalis</i>	-	-	-	S3		1	
Site 3	Dickie Brook Secondary Watershed (1EQ-2)	July 19, 2023	613309	5019720	N/A	N/A	-	-	-	-	282	0	0
Site 4 Cutler Brook		July 19, 2023	614692	5019581	N/A	N/A	-	-	-	-	856	0	0
Site 5		July 20, 2023	616309	5019376	American Eel	<i>Anguilla rostrata</i>	-	Threatened	-	S3N	927	1	1

⁽¹⁾ Two passes conducted due to fast flowing water making catching of fish difficult.

The electrofishing surveys resulted in 12 brook trout and six American eel being caught across the five assessed watercourses. American eel was observed in three of the five surveyed locations. Brook trout were present in two of the five assessed locations. Brook trout individuals caught were in the parr life stage. Representative photographs of fish species captured within the Study Area are provided in Appendix I.

Priority Species

The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a) was used to identify priority species and habitat associated with the Project. SAR and SOCI within 5 km of the Study Area and those observed during field surveys and their respective habitat associations were compared to the habitat present within the Study Area. Only those aquatic SAR or SOCI, and their respective habitats, with potential to interact with the Project have been designated as Project-specific priority species. Interactions may include removal or disturbance of a SAR or SOCI and/or their associated habitat. Priority species include:

- American eel
- Atlantic salmon [Nova Scotia Southern Upland East population (formerly known as Nova Scotia Southern Upland population)]
- Brook floater
- Brook trout
- Eastern pearlshell

American Eel

The American eel is assessed as Threatened under COSEWIC and ranked S3N by ACCDC (2025c). American eel are not listed under SARA. American eel are a migratory species with life stages in freshwater, estuary, and marine environments (COSEWIC, 2012a). Though much is still unknown about the American eel, several studies have shown a temperature preference of around 16.7°C (Blakeslee et al., 2018). American eel spawning occurs in the marine environment at the Sargasso Sea and only once during their lifespan. American eel larvae, known as leptocephali, drift westward towards the coast, where they grow into glass eels and begin to migrate inland to freshwater habitats for maturation (COSEWIC, 2012a). Within freshwater habitats, this species of eel is typically found in rivers and lakes, and will readily burrow into mud, sand, fine gravel, cobble, and woody debris. Within marine environments, American eels are commonly associated with protected shallow waters containing submerged vegetation (e.g., eelgrass) and woody debris (COSEWIC, 2012a).

American eel were captured in three of the five locations sampled during the 2023 electrofishing surveys (Drawing 9.3A to 9.3Q).

Atlantic Salmon

The Atlantic salmon – Nova Scotia Southern Upland population is assessed as Endangered by COSEWIC and ranked S1 by ACCDC (2025c). This population in December 2025 was split into two distinct populations: Nova Scotia Southern Upland West and Nova Scotia Southern

Upland East populations. The Nova Scotia Southern Upland East population is not currently listed under SARA. This population of Atlantic salmon occupy rivers in the Eastern Shore that drain into the Atlantic, east of the Musquodoboit River (DFO, 2013).

In general, the freshwater habitat preference of Atlantic salmon includes clear, well-oxygenated waters in streams with bottoms of gravel, cobble, and boulder. Atlantic salmon prefer cool waters, with spawning typically observed in the 4.4 to 10°C range, and growth typically observed in the 5 to 19°C range (US Fish and Wildlife Service, 2021a). As temperatures rise above 23°C, habitat potential decreases, and Atlantic salmon will search for deeper and cooler waters. Riffles, rapids, and pools are also necessary components for various life stages, with the preferred depth being in the 10 to 40 cm range (US FWS, n.d.). Furthermore, Atlantic salmon prefer a circumneutral pH ranging from 6.5 to 7.5 (MDEP, 2022).

Atlantic salmon species undertake long feeding migrations to the ocean as older juveniles and adults and return to freshwater streams to reproduce. Marine habitat features for both Southern Upland Atlantic salmon and the Gulf of St Lawrence populations have not been identified due to the vast spatial and temporal variations (DFO, 2013). Southern Upland Atlantic salmon smolts migrate seaward from rivers during May-July and adults return to the rivers in the late fall to spawn (COSEWIC, 2011). Smolts from the Gulf of St Lawrence population head to marine waters in spring and early summer (DFO, 2025b).

The closest ACCDC observation of Atlantic salmon is 2.1 ± 0.5 km from the center of the Study Area within New Harbour River that flows through the Study Area (ACCDC, 2025c).

Brook Floater

The brook floater is listed as Special Concern under SARA and COSEWIC, Threatened under the ESA, and ranked S3 by ACCDC (ACCDC, 2025a). Brook floaters are medium sized freshwater mussels that are confined to only 15 watersheds in Nova Scotia and New Brunswick (COSEWIC, 2009). The closest known river that supports brook floater populations is the Salmon River which is less than a kilometre away from the most northern portion of the Study Area. This species of mussel is typically found in shallow rivers or streams with moderate to high water flow, and substrate consisting of a rocky bottom with cobble and sand or fine gravel (DFO, 2016). Furthermore, brook floaters prefer environments with dissolved oxygen levels above 6 milligrams per litre, and a pH greater than 5.4 (DFO, 2016).

Brook floaters are considered long-term brooders, known to hold onto their larvae (called glochidia) for almost a year (COSEWIC, 2009). From there, larvae are released into the water column when temperatures rise above 14°C, where they attach to the body, gills or fins of fish, remaining there through fall and winter until being released in the following spring (COSEWIC, 2009). After development on the host fish, juveniles burrow into the substrate of rivers where they grow into adults. As sessile organisms, brook floaters require areas of flow refuge with stable substrate (COSEWIC, 2009) and in this life stage, like other mussels, brook floaters feed on algae, bacteria, and other particles filtered from the water column (COSEWIC, 2009).

The closest ACCDC observation of brook floater is 15.8 ± 0.1 km from the centre of the Study Area (ACCDC, 2025a).

Brook Trout

Brook trout are not listed under federal (SARA) or provincial (ESA) legislation as a SAR; however, they are ranked S3 by ACCDC (2025c). This species of trout is typically found in cold, clear, and well oxygenated rivers and lakes with plenty of shade and gravel substrate (US FWS, 2009). They prefer water temperatures that do not exceed 20°C, though adult fish can tolerate temperatures of up to 25°C for short periods of time. Furthermore, despite being able to reproduce in waters with a pH as low as 4.5, they do best in a pH range of 5.0 to 7.5 (MDNR, 2012).

Brook trout are a migratory species that migrate further inland to rivers and lakes during the fall months to spawn. Sea-run Brook trout may spend April to June in marine environments, but migration to marine habitat does not always occur year to year, with some Brook trout never entering marine environments (DFO, 1988). In Nova Scotia, Brook trout are considered the number one sportfish, with approximately 2 million trout stocked within the province on an annual basis (NSFA, 2005).

Brook trout were captured within the Study Area during the 2023 electrofishing surveys.

Eastern Pearlshell

Eastern pearlshell are not listed under federal (SARA) or provincial (ESA) legislation as a SAR; however, they are ranked as S2 by ACCDC (ACCDC, 2025c). The eastern pearlshell is a large, long-lived freshwater mussel with a thick, enlarged, oval to slightly kidney-shaped shell that typically reaches up to 15 cm in length (Massachusetts Government, 2026). Its exterior is dark brown to black and relatively smooth, often worn in older individuals, while the interior is lined with bright silvery to white nacre. Absence and/or reduced hinge teeth help distinguish it from many other Nova Scotian freshwater mussels. The species has a large muscular foot for burrowing and usually sits partially buried in sand or gravel. It is notable for its exceptional longevity, living up to 100 years or more. It has a parasitic larval stage that depends on salmonid fishes such as Atlantic salmon and brook trout (Massachusetts Government, 2026).

The closest ACCDC observation of eastern pearlshell is 15.8 ± 0.1 km from the centre of the Study Area (ACCDC, 2025c).

In-Situ Water Quality

Water quality results are reported and discussed as it relates to the chemical characteristics required for suitable fish habitat. Where applicable, water quality sampling results are measured against the CCME and FWAL guidelines. A summary of water quality measurements is presented in Table 9.6. Water quality measurement locations coincide with fish collection locations, shown on Drawing 9.3A to 9.3Q. The results generally provide a snapshot of in-situ water quality from select aquatic features in July 2023.

Table 9.6: Results of the In-situ Water Chemistry Analysis Complete for Fish Collection within the Study Area

Site	Sampling Dates	Water Temp (°C)	pH	Conductivity (µS/cm)
Site 1	July 6, 2023	18.8	4.8	30
Site 2	July 7, 2023	18.5	4.6	40
Site 3	July 19, 2023	17.0	4.4	40
Site 4	July 19, 2023	19.0	4.6	30
Site 5	July 20, 2023	17.0	4.5	40

Water temperature affects the metabolic rates and biological activity of aquatic organisms, thus influencing the use of habitat by aquatic biota. There are no CCME guidelines related to temperature and aquatic biota. Temperature preferences of fish vary between species, as well as with size, age, and season. All temperatures recorded are considered within the suitable temperature range for cold-water fish species (< 20 °C).

The CCME FWAL guidelines suggest a range of pH from 6.5 to 9.0 is suitable within freshwater habitat to support aquatic health. Kalff (2002) indicates that the loss of fish populations is gradual and depends on fish species, but decline is evident when pH is < 6.5. Kalff (2002) further states that a 10 to 20% species loss is apparent when pH < 5.5. Nova Scotia typically has more acidic freshwater systems with pH ranging from 5 to 9. Surface water features within the Study Area were found to be slightly acidic with pH ranging from 4.4 to 4.8, with an average pH of 4.6. All the sampled sites exhibited pH so low to expect species loss (< 5.5).

Conductivity is often used as the baseline for detecting potential sources of pollution and changes in water quality. Significant changes in these parameters could indicate that a discharge or some other source of pollution has entered the aquatic resource. Conductivity levels measured within the Study Area are considered typical for Nova Scotia (NSSA, 2014).

9.1.5 Effects Assessment

Project-Surface Water and Fish and Fish Habitat Interactions

Project activities, primarily those that involve earth moving, vegetation removal, and road construction have the potential to impact watercourses, and fish and fish habitat (Table 9.7). These potential impacts could include habitat loss, changes to hydrology, and/or displacement of sediment.

Table 9.7: Potential Project-Surface Water, Fish and Fish Habitat Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	X
Decommissioning	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries

The LAA for watercourses includes the Assessment Area. The RAA includes the secondary watersheds that intersect the Study Area (Drawing 9.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 also apply to watercourses. The VC-specific definition for magnitude is as follows:

- Negligible: No loss of fish or fish habitat. No expectation for changes to water quantity or quality.
- Low: Small loss of fish or fish habitat, with minimal potential for changes to water quantity or quality or resulting impacts to fish.
- Moderate: Moderate loss of fish or fish habitat. Changes to water quantity or quality expected but can be managed with routine measures. Impacts to fish will only be experienced by individuals rather than entire populations and can be managed with routine measures.
- High: High loss of fish and fish habitat. Changes to water quantity or quality expected that would be challenging to manage with routine measures. Impacts to fish will be experienced by entire populations and cannot be managed with routine measures; the population's life history is permanently altered.

Effects

Habitat Loss

The Project design has been optimized to minimize interactions between the Project and watercourses and wetlands that may support fish and fish habitat. However, in areas where watercourse/wetland interactions are unavoidable, there is a potential for habitat loss.

Watercourse alterations (e.g., culvert installations) required for the Project have the potential to impact aquatic habitat. The removal of overhanging vegetation from stream banks decreases shade/cover for fish resulting in increased vulnerability to predators. Likewise, the removal of instream cover, such as coarse woody debris or edge habitat (e.g., undercut banks) can have a negative effect on both fish and aquatic invertebrate habitat (MTO, 2009). Furthermore, alterations to channel morphology including altered substrate composition and interference with sediment transport can also result in aquatic habitat degradation.

A total of 149 watercourses were identified within the Assessment Area. To be conservative, all watercourses identified are presumed to be accessible to fish, even though there may be seasonal restrictions to the intermittent watercourses or permanent barriers downstream preventing fish passage.

The Project may interact with up to 120 watercourses through either an upgrade to an existing watercourse crossing or construction of a new crossing. Some (estimated at 50) of these watercourses contain pre-existing crossings that have structurally declined. Therefore, some watercourses are expected to see improved hydrology and fish passage with upgraded crossings. There are an additional 16 watercourses within turbine pad buffers or laydown areas that will be avoided following micro-siting efforts during the detailed design phase.

A summary of the watercourses identified to be directly affected by the Project (i.e., new road crossing or upgrading in existing crossing) is provided in Table 9.8.

Table 9.8: Direct Effect Summary

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC1	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC2	Intermittent	None observed.	Structure to be installed for road crossing.
WC3	Small Perennial	None observed.	Structure to be installed for road crossing.
WC4	Small Perennial	None observed.	Structure to be installed for road crossing.
WC5	Large Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC6	Small Perennial	Yes, wooden bridge installation for road crossing.	Crossing to be assessed and potentially replaced during road upgrades.
WC8	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC9	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC10	Small Perennial	Yes, wooden bridge installation for road crossing.	Crossing to be assessed and potentially replaced during road upgrades.
WC11	Intermittent	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC12	Large Perennial	None observed.	Structure to be installed for road crossing.
WC13	Small Perennial	None observed.	Structure to be installed for road crossing.
WC14	Small Perennial	Yes, wooden bridge installation for road crossing.	Crossing to be assessed and potentially replaced during road upgrades.
WC15	Large perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC16	Intermittent	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC17	Intermittent	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC18B	Small Perennial	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC19	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC20	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC21	Intermittent	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC22B	Small Perennial	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC23	Intermittent	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC24	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC26	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC28	Intermittent	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC29	Small Perennial	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC30	Large Perennial	None observed.	Structure to be installed for road crossing.
WC32	Small Perennial	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC33	Small Perennial	None observed.	Structure to be installed for road crossing.
WC34	Large Perennial	None observed.	Structure to be installed for road crossing.
WC35	Small Perennial	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC36	Small Perennial	None observed.	Structure to be installed for road crossing.
WC37	Intermittent	None observed.	Structure to be installed for road crossing.
WC38	Large Perennial	Yes, wooden bridge installation for road crossing.	Crossing to be assessed and potentially replaced during road upgrades.
WC40	Small Perennial	None observed.	Structure to be installed for road crossing.
WC41	Small Perennial	Yes, box culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC42	Large Perennial	None observed.	Structure to be installed for road crossing.
WC45	Large Perennial	Yes, wooden bridge installation for road crossing.	Crossing to be assessed and potentially replaced during road upgrades.
WC46	Large Perennial	None observed.	Structure to be installed for road crossing.
WC47	Small Perennial	Yes, wooden bridge installation for road crossing.	Crossing to be assessed and potentially replaced during road upgrades.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC49	Intermittent	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC51	Intermittent	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC52	Intermittent	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC53	Intermittent	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades..
WC54	Intermittent	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC55	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC56	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC57	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC58	Intermittent	None observed.	Structure to be installed for road crossing.
WC59	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC60	Small Perennial	None observed.	Structure to be installed for road crossing.
WC63	Small Perennial	None observed.	Structure to be installed for road crossing.
WC64	Intermittent	None observed.	Structure to be installed for road crossing.
WC65	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades
WC66	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC67	Intermittent	None observed.	Structure to be installed for road crossing.
WC68	Intermittent	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC70	Intermittent	This watercourse was field delineated, but due to field form errors, the data was lost. A review of aerial imagery suggests an existing alteration is present.	Culvert to be assessed and potentially replaced during road upgrades.
WC73	Small Perennial	None observed.	Structure to be installed for road crossing.
WC74	intermittent	None observed.	Structure to be installed for road crossing.
WC75	intermittent	None observed.	Structure to be installed for road crossing.
WC76	Small Perennial	None observed.	Structure to be installed for road crossing.
WC77	intermittent	None observed.	Structure to be installed for road crossing.
WC78	Small Perennial	None observed.	Structure to be installed for road crossing.
WC79	Small Perennial	None observed.	Structure to be installed for road crossing.
WC80	Small Perennial	None observed.	Structure to be installed for road crossing.
WC81	intermittent	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC82	Small Perennial	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC84	intermittent	Yes, metal culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC86	intermittent	Yes, wooden bridge installation for road crossing.	Crossing to be assessed and potentially replaced during road upgrades.
WC87	Small Perennial	None observed.	Structure to be installed for road crossing.
WC89	Small Perennial	None observed.	Structure to be installed for road crossing.
WC90	intermittent	Yes, box culvert at road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC92	Small Perennial	None observed.	Structure to be installed for road crossing.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
WC93	Small Perennial	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC94	intermittent	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC95	intermittent	None observed.	Structure to be installed for road crossing.
WC96	intermittent	None observed.	Structure to be installed for road crossing.
WC98	intermittent	Yes, plastic culvert installation for road crossing.	Culvert to be assessed and potentially replaced during road upgrades.
WC99	Small Perennial	None observed.	Structure to be installed for road crossing.
PWC1	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC2	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC3	Intermittent	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC5	Intermittent	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC6	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
PWC7	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC10	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC11	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC12	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC13	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC14	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC15	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC16	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
PWC17	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC18	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC19	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC20	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC21	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC22	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC24	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC26	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
PWC27	Large Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC28	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC29	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC30	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC31	Intermittent	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC32	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC33	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC34	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
PWC35	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC36	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC39	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC40	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC43	Small Perennial	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC44	Intermittent	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC45	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC46	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.

Watercourse	Watercourse Type	Existing Alteration Present?	Forecasted Alteration
PWC47	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.
PWC49	Intermittent	This watercourse has not been field assessed. It is assumed to have no existing alteration based on aerial imagery.	Structure to be installed for road crossing.
PWC50	Small Perennial	This watercourse has not been field assessed. It is assumed to have an existing alteration based on aerial imagery.	Culvert to be assessed and potentially replaced during road upgrades.

If required, the 120 forecasted alterations could involve potentially upgrading 50 of the existing watercourse crossings to facilitate upgrading the existing road and the installation of up to 70 new crossings associated with new roads. The Proponent will obtain approval under the NSECC watercourse alteration process, as required (NSECC, 2015a). DFO will review the application to determine whether the crossing will result in a HADD of fish habitat. Based on Strum's experience with culvert design, crossing construction, monitoring, and mitigation implementation, it is anticipated that standard design and construction practices can be applied to avoid a HADD determination. No additional direct impacts to watercourses, waterbodies, or wetlands supporting fish habitat are expected.

Fish Injury or Mortality

If required, blasting may result in sensory disturbance to fish, impacting fish behaviour, spawning grounds, and migration patterns. The detonation of explosives near watercourses can produce post-detonation shock waves which involves a rise to a high peak pressure and then a subsequent fall to below ambient hydrostatic pressure. This pressure deficit can cause impacts in fish (Wright & Hopky, 1998). An overpressure in excess of 100 kilopascals can result in effects on fish including damage to the swim bladder in finfish, and potential rupture and hemorrhage to the kidney, liver, spleen and sinus venous. It is also possible that fish eggs and larvae can be damaged (Wright & Hopky, 1998). The degree of damage is related to the type of explosive, size, and pattern of the charges and the distance to the watercourse, depth of water within the watercourse, and species, size and life stage of the fish.

Sublethal effects have also been observed including changes in fish behaviour as a result of noise produced during blasting (Wright & Hopky, 1998). Should blasting be required, guidance outlined by Wright and Hopky (1998) will be used to develop a Blasting Management Plan. The Blasting Management Plan will be designed to ensure that appropriate setback distances are

maintained, or mitigations are implemented to protect fish and fish habitat from the potential impacts of blasting.

Changes in Surface Water Quantity and Quality

Changes to the amount of flow can alter channel morphology, increase flood potential, cause erosion, and disrupt habitat characteristics that support vulnerable species (MTO, 2009) .

These impacts could result from:

- Alteration of bank or channel grades for road development.
- New or upgraded watercourse crossings.
- Compaction of soil from the heavy machinery required for turbine assembly.
- Alteration of channel beds to facilitate the removal and replacement of preexisting infrastructure (e.g., collapsed culverts).

Changes in surface water quality can arise from alterations to the surrounding environment and can include an increase in water temperature from decreased shade, an increase in pollutants from machinery and infrastructure, and the mobilization of sediments (MTO, 2009). Given the dynamic nature of channeling water, effects on water quality can quickly spread throughout different reaches of the respective watershed.

Sediment mobilization within aquatic environments can cause shifts in ecological integrity, including changes to plant species composition, the distribution of primary and secondary producers, and the habitat suitability for vulnerable species (Tilman et al., 1997). Erosion and sedimentation can occur throughout the lifecycle of the Project, including during construction efforts, routine road maintenance, and daily traffic. However, the highest potential for these effects is related to the construction and upgrading of access roads, and the installation or upgrading of crossing structures. The alteration or removal of riparian vegetation can also result in bank instability and erosion, further exasperating these effects (MTO, 2009).

Mitigation Measures

The following mitigative measures will be implemented to avoid and mitigate any potential effects on watercourses. In addition, the Proponent will develop and implement a Surface Water Management Plan, Erosion and Sediment Control Plan, Blasting Management Plan, and a site-specific Contingency Plan.

As required, all work completed under the provincial watercourse alteration notification process will be done in accordance with the Nova Scotia Watercourse Alterations Standards and will be executed by a certified Watercourse Alteration Installer/Sizer. For work requiring a watercourse alteration approval, specific and detailed mitigation will be developed and submitted to NSECC as part of the application process.

The following mitigation measures will be implemented:

Habitat Loss

- Educate Project personnel on the sensitivity of aquatic habitat.
- Flag watercourses and avoid impacts to the watercourse and adjacent riparian habitat to the extent practicable.
- Obtain watercourse alteration approval from NSECC and adhere to the terms and conditions of the approval, as required.
- Require that the crossing is installed by a certified Watercourse Alteration Installer/Sizer, and designed to avoid any permanent diversion, restriction or blockage of natural flow, such that the hydrologic function of the watercourse is maintained.
 - Follow best management practices during culvert installation (e.g., installation in the dry and following appropriate timing windows, where practicable).
- Require that Project activities (fueling included) or removal of vegetation not be conducted within 30 m of any delineated or mapped watercourse, without authorization from NSECC.
- Allow for natural vegetation along the watercourse edge and above the ordinary high-water mark to facilitate the stabilization of the area, and restoration of fish habitat.
- Conduct any work within the bed of a watercourse between June 1 and September 30 to avoid sensitive periods in the life cycles of fish, to better control water flow, and to allow for a faster vegetation period (NSECC, 2015b).
 - Consult with NSECC and DFO if work is required outside of appropriate timing windows.
- Complete a fish rescue, as required, during instream work requiring isolation of flow.

Fish Injury or Mortality

- Develop a Blasting Management Plan, if blasting is required, that is informed by the guidance provided in Wright and Hopky (1998).

Changes in Surface Water Quantity and Quality

- Develop and implement a Surface Water Management Plan.
 - Integrate water management systems including diversion and collection ditches, roadside drainage channels, vegetated swales, and stormwater retention ponds, as directed by the Surface Water Management Plan.
- Design any necessary alterations in a way that maintains the natural grade of the watercourse, to ensure the hydroperiod remains as it was pre-alteration.
- Fit any watercourse crossings with appropriately sized infrastructure, as prescribed by a certified Watercourse Alteration Installer/Sizer.
- Develop a site-specific Erosion and Sediment Control Plan during the detailed design phase.
 - The plan will target the disturbance to banks (as required) and adjacent land, and will address the type of control structures, proper installation techniques, grading, maintenance and inspection, timing of installation, and vegetation.
- Maintain 30 m vegetated buffers around watercourses, to the extent practicable.

- Integrate outlet protection features to dissipate flow velocities and decrease erosion at the outflow.
- Require that if concrete is to be used, it is pre-cast and cured for at least one week prior to use at a crossing site (NSECC, 2015b).
- Use untreated, rot-resistant timber (e.g., hemlock, tamarack, juniper, or cedar) below the ordinary highwater mark to avoid the leaching of toxic preservatives into waterways (NSECC, 2015b).
- Use rock material that is clean, coarse granular, non-ore-bearing, non-watercourse-derived, and non-toxic to aquatic life (NSECC, 2015b).
- Plan any construction activities that may impact stream banks and substrate to align with low-flow periods.

Monitoring

For crossings subject to provincial notification requirements, visual monitoring will be completed during the installation process to ensure the work is conducted in accordance with the Nova Scotia Watercourse Alteration Activity Standards (NSECC, 2015c). If the crossing requires an approval, monitoring will be determined as part of the permitting process.

A watercourse monitoring plan, if required as part of the permitting phase, may include hydrological, sediment, and stability assessments upstream, downstream, and at the crossing of the watercourse.

Conclusion

The predicted residual effects of the Project (after mitigation) are characterized in Table 9.9.

Table 9.9: Surface Water and Fish and Fish Habitat Residual Effects

Effect Detail	Habitat loss	Fish Injury or Mortality	Changes to Water Quality and Quantity
Magnitude of Effect	Low: A small loss of fish habitat.	Negligible: No loss of fish expected.	Low: Minimal potential for altered hydrology or impact to fish.
Geographic Extent of Effect	Assessment Area	N/A	Assessment Area
Frequency of Effect	Single Event: Effects may occur during initial construction.	N/A	Intermittent: Effects may occur during initial construction and during operations.
Duration of Effect	Medium Term: Effects may occur during all phases but will not extend beyond decommissioning.	N/A	Medium Term: Effects may occur during all phases but will not extend beyond decommissioning.
Reversibility of Effect	Partially Reversible	N/A	Partially Reversible
Significance Level	Not Significant	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible			

9.2 Wetlands

9.2.1 Overview

Wetland assessments were conducted to identify and delineate wetland habitat so that impacts to wetland area and function could be avoided and minimized, to the extent practicable. This was achieved by using the following approach:

- Identify wetland habitat in the Study Area using desktop resources.
- Ground-truth and delineate wetland habitat within the Assessment Area.
- Complete functional assessments for delineated wetlands within the Assessment Area.
- Identify the potential for and confirm the presence of Wetlands of Special Significance (WSS) within the Assessment Area.
- Use the results to refine the Project design to avoid/minimize impacts to wetlands, to the extent practicable.

9.2.2 Regulatory Context

The Nova Scotia Wetland Conservation Policy (NSECC, 2019b) outlines a policy goal of no loss of WSS and no net loss in area and function for other wetlands. Wetlands are considered WSS based on the wetland having significant species or species assemblages, high levels of biodiversity, significant hydrological value, or high social or cultural importance. Under this policy, the following wetlands are considered WSS:

- All salt marshes.
- Wetlands that are within or partially within a designated Ramsar site, Provincial Wildlife Management Area (Crown and Provincial lands only), Provincial Park, Nature Reserve, Wilderness Area or lands owned or legally protected by non-government charitable conservation land trusts.
- Intact or restored wetlands that are project sites under the North American Waterfowl Management Plan and secured for conservation through the Nova Scotia Eastern Habitat Joint Venture program.
- Wetlands known to support at-risk species as designated under SARA or ESA.
 - This applies only to the portion of the wetland directly supporting species designated as 'Threatened' and/or 'Endangered' (M. Gorman, 2023)
- Wetlands in designated protected water areas as described within Section 106 of the *Environment Act*, S.N.S. 1994-95, c. 1.

Additionally, a wetland can be determined to be a WSS based on its functional assessment score (discussed further in Section 9.2.4).

Per Section 5 of the *Environment Act*, S.N.S. 1994-95, c. 1, approval from NSECC is required to alter a wetland. Nova Scotia considers a wetland alteration to be any activity that may affect wetland function and habitat. Such activities include, but are not limited to, excavating, flooding, infilling, or draining (Nova Scotia, 1995b).

9.2.3 Desktop Review

A desktop review for the location and extent of potential wetlands across the Study Area was completed using the following information sources:

- Wetlands Inventory (ECCC, 2024a)
- WSS Database (NSECC, 2020b)
- Nova Scotia Hydrographic Network (ODNS, 2024)
- WAM Database (NSECC, 2022c)
- Nova Scotia Digital Elevation Model (DEM) (GeoNOVA, 2024b)
- Satellite and aerial imagery

The Wetland Inventory (ECCC, 2024a) identified 644 wetlands overlapping with the Study Area, which are classified as: swamp (308), fen (24), bog or fen (196), unknown (95), marsh (12), salt marsh (one), and water (eight). The wetlands range in size from 0.06 ha to 158 ha (Drawing 9.5).

According to the NSNR WSS database (2020b), there are 29 potential WSS overlapping with the Study Area. These wetlands were predicted to be potential WSS based on the following flagging criteria found in the Nova Scotia Wetland Conservation Policy (NSECC, 2019b): one salt marsh; 15 wetlands partially within designated areas (Loon Lake Nature Reserve, Guysborough Headlands Wilderness Area, and New Harbour Provincial Park), two wetlands partially within areas pending designation (Isaacs Harbour River Wilderness Area and Chedabucto Fault Nature Reserve); and 11 wetlands overlapping with reported observations of

SAR. Three of these potential WSS overlap with the Assessment Area, including one wetland partially within a designated area, one wetland partially within an area pending designation, and one wetland containing a reported SAR observation. At the time of the WSS database being published, Guysborough Headlands Wilderness Area and New Harbour Provincial Park were both pending designation; however, these areas have since been designated in 2023 and 2024, respectively (Nova Scotia, 2023, 2024).

The Nova Scotia Hydrographic Network (ODNS, 2024) was used in conjunction with the WAM database (NSECC, 2022c) and DEM layer to further assess the distribution of confirmed and potential wetland habitat within the Study Area. These sources identified potential wet areas and predicted flow based on the assumed depth-to-water generated from digital elevation data (Drawing 9.2).

Wet Area Modelling

Wet area modelling was conducted prior to field surveys to identify target areas with a high likelihood of containing wetlands and guide field surveys. To create the model, an artificial intelligence method known as Deep Learning was used in tandem with GIS to create an improved wet area map of the Study Area.

To train the model, sample wetland data sourced from NSNR was used to create image chips of the predictor variables. These image chips were also able to incorporate the results of the field assessments, thus allowing for further fine tuning of the model. During this process, training loss, validation loss, accuracy, and dice were calculated, all crucial to strengthening the accuracy and validity of the Deep Learning process. That is, once the model was created, it was assessed to ensure reasonable predictions were computed, and field assessment results were utilized to cross check for validation.

The predictor variables used were multiband imagery from a high-resolution satellite, and elevation-based data products derived from the provincial LiDAR. Additionally, terrain preprocessing and elevation surface analysis were completed and conditioned to enhance the output.

The elevation derived data products comprise three groups: hydrology, geomorphometry, and visualization products. These datasets offer unique inputs to the model, incorporating topography and vegetation into the classification while focusing on principal components. Furthermore, these data products inform the model and the Quality Assurance/Quality Control (QA/QC) process.

The results of the desktop review assisted in scoping field studies and were ultimately used to conduct a constraints analysis thus refining turbine/road siting locations to avoid known wetland features to the extent practicable.

9.2.4 Field Assessment

9.2.4.1 *Field Assessment Methodology*

General

Wetland field assessments were completed within the Assessment Area between June and October in 2023, and June and November in 2024. Surveys included high-level assessments for hydrology, complemented by in-depth wetland delineations and functional assessments. Wetland surveys were done in conjunction with watercourse assessment surveys (Section 9.1).

To accompany wetland field surveys, a list of SAR and SOCI known to occur within the region of the Project was compiled to help with incidental identification. Details of any incidental SAR or SOCI observations are captured under their respective reporting sections, as applicable to the species observed.

Field Delineations

Strum ecologists surveyed the Assessment Area, delineating and characterizing each wetland identified in accordance with the U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). Wetland boundaries were determined by confirming the following:

- Presence of hydrophytic (water loving) vegetation.
- Presence of hydrologic conditions which result in periods of flooding, ponding, or saturation during the growing season.
- Presence of hydric soils.

A positive indicator must typically be present for all three parameters to definitively identify any given site as a wetland (Environmental Laboratory, 1987). Field staff walked meandering transects throughout the landscape to look for wet areas. When wetlands were identified, the boundary was flagged, and the spatial boundaries were recorded on iPads using the Environmental Systems Research Institute software Survey 123.

Identification of Hydrophytic Vegetation

Hydrophytic vegetation is defined as the sum of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produces permanent or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present (Environmental Laboratory, 1987). Hydrophytic vegetation should be the dominant plant type observed in wetland habitat (Environmental Laboratory, 1987).

Dominant plant species observed in each wetland were classified according to indicator status (probability of occurrence in wetlands), in accordance with the U.S. Fish and Wildlife Service National List of Vascular Plant Species that Occur in Wetlands: NE Region (Region 1) (US FWS, 1988) (Table 9.10). These indicators are used as this region most closely resembles the flora and climate regime of Nova Scotia.

Table 9.10: Classification of Wetland-Associated Plant Species

Plant Species Classification	Abbreviation ⁽¹⁾	Probability of Occurring in Wetland
Obligate	OBL	>99%
Facultative Wetland	FACW	66% to 99%
Facultative	FAC	33% to 66%
Facultative Upland	FACU	1% to 33%
Upland	UPL	<1%
No indicator status	NI	Insufficient information to determine status
Plants That Are Not Listed (assumed upland species)	NL	Does not occur in wetlands in any region

Source: (US FWS, 1988)

⁽¹⁾ A '+' or '-' symbol can be added to the classification to indicate greater or lesser probability, respectively, of occurrence in a wetland.

If the majority (greater than 50%) of the dominant vegetation at a data point is classified as obligate (OBL), facultative wetland (FACW), or facultative (FAC), then the location of the data point is considered to be dominated by hydrophytic vegetation.

Identification of Hydric Soils

A hydric soil is formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper layer (USDA NRCS, 2003). Indicators of the presence of hydric soils include soil colour (gleyed soils and soils with bright mottles and/or low matrix chroma), aquic or preaquic moisture regimes, reducing soil conditions, sulfidic material (odour), soils listed on the hydric soils list, iron and manganese concretions, organic soils (histosols), histic epipedons, high organic content in the surface layer of sandy soils, and organic streaking in sandy soils.

During field surveys, soil pits were excavated to a minimum depth of 40 cm or until (auger) refusal. The soil in each pit was then examined for hydric soil indicators. The matrix colour and mottle colour (if present) of the soil were determined using Munsell Soil Colour Charts.

Determination of Wetland Hydrology

Wetland habitat, by definition, either periodically or permanently has a water table at, near, or above the land surface. To be classified as a wetland, a site should have at least one primary indicator or two secondary indicators of wetland hydrology (Table 9.11). Wetland habitat is assessed for signs of hydrology via visual observations across the area and through the assessment of soil pits.

Table 9.11: Indicators of Wetland Hydrology

Examples of Primary Indicators	Examples of Secondary Indicators
Surface Water	Oxidized Root Channels in the Upper 30 cm
Saturation	Local Soil Survey Data
Sediment Deposition	Dry Season Water Table
Drainage Patterns	Stunted or Stressed Plants

Examples of Primary Indicators	Examples of Secondary Indicators
Water-stained Leaves	Drainage Patterns
Sparsely Vegetated Concave Surfaces	Surface Soil Cracks
Hydrogen Sulfide Odor	Moss Trim Lines

Source: As identified in the Nova Scotia Wetland Delineation Data Form (NSECC, 2011c) which has been adapted from the U.S. Army Corps of Engineers form for Northeast-North Central Supplement for use in Nova Scotia (Environmental Laboratory, 1987)

Predicted Wetland Mapping

Drone-assisted wet area modelling was employed to identify predicted wetlands (PWL) within the Assessment Area where field-delineation was not completed. Drone technology was used between June and October 2024 to collect data in areas of the Study Area that were inaccessible by foot or presented safety challenges. This data was then used to inform the delineation and characterization of PWLs within the Assessment Area. Drones were employed to provide a cost-effective and efficient means of data collection, offering high-resolution imagery and facilitating the analysis of otherwise challenging terrain. Strum met with NSECC's wetland specialists on June 8, 2023, to present this approach.

Prior to conducting field surveys, a comprehensive flight plan was created using drone navigation software. This included defining the survey area, establishing optimal flight paths, and specifying the altitude for data acquisition to ensure full coverage of the wetland and minimize the risk of missing critical data points. Once the data were collected, orthomosaic maps were created by stitching together individual images, with an emphasis on correcting for distortions and enhancing the overall quality of the dataset for subsequent analysis.

Drone-derived data were then combined with other geospatial information, including satellite imagery, wet area modelling, and ground-based measurements, to enhance the overall understanding of the wetland dynamics, ensuring a comprehensive characterization of the survey area. Once all the data was integrated, high-level characterizations and boundaries were inferred, providing a nuanced perspective on the features and connectivity of otherwise inaccessible wetlands.

Across various projects, Strum has observed drone surveys carried out using the methodology above to be a conservative assessment approach, typically yielding a slightly larger delineated area than what would be ground-truthed.

Functional Assessments

Wetland functional assessments were completed in conjunction with field delineations for wetlands identified within the Assessment Area. Functional assessments were completed using the Wetland Ecosystems Services Protocol – Atlantic Canada (WESP-AC) evaluation technique Version 2 (Adamus, 2021). The WESP-AC process involves the completion of three forms: a desktop review portion (Office Form) that examines the landscape level aerial conditions to which the wetland is situated, and two field forms identifying biophysical characteristics of the wetland (Field Form) and stressors to the wetland (Stressors Form), if

any. The process serves as a rapid method for assessing individual wetland functions and values. WESP-AC addresses multiple specific functions that wetlands may provide (Table 9.12).

Table 9.12: WESP-AC Function Parameters

Grouped Wetland Function	Specific Wetland Functions
Hydrologic Function	Surface Water Storage
Aquatic Support	Aquatic Invertebrate Habitat
	Stream Flow Support
	Organic Nutrient Export
	Water Cooling
Water Quality Support	Sediment Retention & Stabilization
	Phosphorus Retention
	Nitrate Removal & Retention
	Carbon Sequestration
Aquatic Habitat	Anadromous Fish Habitat
	Resident Fish Habitat
	Waterbird Feeding Habitat
	Waterbird Nesting Habitat
	Amphibian and Turtle Habitat
Transition Habitat	Songbird, Raptor, & Mammal Habitat
	Pollinator Habitat
	Native Plant Habitat

Source: (Adamus, 2021)

The specific wetland functions are individually allocated into grouped wetland functions and measured for “functional” and “benefit” scores. Wetland function relates the wetland’s natural ability (i.e., water storage), whereas wetland benefits are benefits of these functions, whether it is ecological, social, or economic. The highest functioning wetlands are those that have both high ‘function’ and ‘benefit’ scores for a given function. WESP-AC enables a comparison to be made between individual wetlands within a province to gain a sense of the importance each has in providing ecosystem services.

In addition to the grouped wetland functions above, WESP-AC also measures the following specific wetland functions, however, these are only evaluated by their benefit scores:

- Wetland Condition
- Wetland Risk (i.e., sensitivity to potential impacts)

For each wetland evaluated, the WESP-AC process calculates the overall score for the grouped wetland functions and the specific wetland functions listed in Table 9.12. One score

each is provided for function and benefit. Scores are ranked as 'Lower,' 'Moderate,' or 'Higher' allowing for analysis of the wetland as compared to calibrated baseline wetland scores in Nova Scotia to date. A 'Higher' WESP-AC score means that wetland has a greater capacity to support those processes as compared to other wetlands in the province. A 'Higher' WESP-AC score in both the function and benefits category means the wetland supports the natural ecosystem functions and provides services with potentially societal importance.

Additionally, the WESP-AC process assesses the wetland for a determination of WSS based on the functional results. The grouped functions outlined in Table 9.12 are further combined into "supergroups" for habitat (Aquatic Habitat and Transition Habitat) and support (Hydrologic, Water Quality Support, and Aquatic Support) functions. WSS designation is dependent on a certain combination of 'moderate' and 'high' scores within these groups.

The WESP-AC functional evaluation technique recognizes that, in many cases, delineation of entire wetlands where they extend beyond a Study Area is not always feasible (e.g., property ownership) or required to complete an appropriate assessment using this tool (NBDELG, 2021). Instead, WESP-AC permits the delimitation of an assessed area, defined as the wetland or portion of wetland physically assessed in the field, while the Office Form considers the broader landscape characteristics and functions that extend beyond the assessed area and/or study area boundary.

9.2.4.2 Field Assessment Results

General

Field surveys completed during 2023 and 2024 identified 349 field-delineated wetlands, either partially or fully within the final iteration of the Assessment Area (Drawing 9.3A to 9.3Q). For coherence, wetlands were given a numerical ID based on the order of their occurrence from north to south. If a wetland was segmented, but segments remained hydrologically connected, the wetland was given the same numeric ID. Detailed results and a photograph log of each wetland are found in Appendix J. Due to the inaccessible nature of some of the Assessment Area and recent design iterations, several areas were not ground-truthed during wetland field surveys. These areas will be assessed in support of wetland permitting as needed.

Of the 349 identified wetlands, the most prominent wetland type was swamp (202). The Canadian Wetland Classification System (NWWG, 1997) defines a swamp as a wetland characterized by the dominance of woody vegetation in which the water table is typically at or near the surface or inundates the soil for a significant portion of the growing season. Swamps are often associated with poorly drained or saturated soils, and they provide important habitat for various plant and animal species adapted to wet conditions. Swamps can be further subdivided into treed swamps or shrub swamps, depending on their physiological makeup.

Of the identified swamps, 112 were classified as treed swamps. Treed swamps are characterized by the presence of trees as the dominant vegetation [>7.5 cm diameter at breast height (DBH)] and an environment that is not as waterlogged as other wetland types, such as

shrub swamps or marshes. These wetlands typically experience their highest hydroperiod during spring and fall precipitation events (NSNR, 2018b). As a result, treed swamps provide deciduous trees [e.g., red maple (*Acer rubrum*) and yellow birch (*Betula alleghaniensis*)] and coniferous trees [e.g., black spruce (*Picea mariana*) and balsam fir (*Abies balsamea*)] the opportunity to establish themselves and adapt to the inconsistent inundation periods (NSNR, 2018b). Typical species composition of the identified treed swamps consisted of cinnamon fern (*Osmundastrum cinnamomeum*), three-seeded sedge (*Carex trisperma*), bunchberry (*Cornus canadensis*), black spruce, and balsam fir. Surface water was observed in approximately half of the treed swamps, while saturation was almost always present, as identified through the excavation of small soil pits.

An additional 51 identified swamps were classified as shrub swamps. Shrub swamps are dominated by shrubs and smaller woody plants (< 7.5 cm DBH, > 1 m tall) with a denser understory and tend to form in permanently or seasonally flooded areas where the surface is moist from ground saturation. Trees may be present but are less dominant than in treed swamps. In many cases, shrub swamps eventually transition into treed swamps via succession (NSNR, 2018b). The typical species composition of shrub swamps identified within the Assessment Area included cinnamon fern, mountain holly (*Ilex mucronata*), northern wild raisin (*Viburnum cassinoides*), sheep laurel (*Kalmia angustifolia*), speckled alder (*Alnus incana*), red maple, and balsam fir. Surface water was more common than within treed swamps, though the temporal extent of the surficial hydroperiod is expected to be seasonal.

The shrub swamps observed throughout the Assessment Area were of both natural origin and the product of extensive forestry activity in the area. In areas of previous harvest, the impacts of reduced interception and evapotranspiration were visible in the form of an increased water yield, including increased soil moisture and increased instances of overland flow and/or water pooling. In such situations, vegetation was often dominated by the dense regeneration of tree species in the early- to mid-successional stage. Typical species included balsam fir, red maple, and yellow birch in the shrub layer, along with bunchberry, three-seeded sedge, and creeping snowberry (*Gaultheria hispidula*) in the herbaceous layer. Furthermore, in areas where forestry machinery had resulted in soil compaction/displacement, the herbaceous layer was often dominated by ruderal graminoid species such as common woolly bulrush (*Scirpus cyperinus*) and soft rush (*Juncus effusus*).

The remaining 39 swamps were classified as treed/shrub swamp complexes, in which areas containing treed swamp and areas containing shrub swamp were present in one contiguous wetland.

There were 78 bogs observed within the Assessment Area. These wetlands are characterized by their poor drainage, accumulation of peat, and dense coverage of either *Sphagnum* moss or graminoids (NSNR, 2018b). Bogs typically have a high water table and receive most of their water from precipitation, resulting in nutrient-poor, acidic environments (NWWG, 1997). This acidity is further compounded due to the release of organic acids that result from the decomposition of *Sphagnum* spp. Typical species composition observed included tawny cottongrass (*Eriophorum virginicum*), three-seeded sedge, small cranberry (*Vaccinium*

oxycoccus), common Labrador tea (*Rhododendron groenlandicum*), cinnamon fern, sheep laurel, and black spruce. Trees, when present, were often stunted and scattered throughout.

There were 11 fens identified within the Assessment Area. Fens typically exhibit more open water than bogs, often with a connection to a watercourse or abutting a lakeshore. They may also receive hydrology from neighbouring uplands. Ultimately, this inundation of water from outside sources facilitates a transfer of nutrients that allow fens to support a wider variety of flora and fauna than bogs (NSNR, 2018b). Typical species assemblages include small cranberry, common Labrador tea, leatherleaf (*Chamaedaphne calyculata*), and black spruce.

One marsh was observed within the Assessment Area. Marshes often display more persistent surface water areas that tend to shrink as the growing season progresses. Hydrology can be influenced by various external sources, including precipitation, surface runoff, surface water connections, and groundwater. This diversity of hydrological sources typically fosters a nutrient-rich environment which, when paired with the lack of canopy cover, often facilitates the vigorous growth of herbaceous vegetation (NSNR, 2018b). In many cases, this vigorous growth can lead to the full engulfment of any open water areas, resulting in meadow-like marshes that may be partially or fully inundated. The marsh observed within the Assessment Area was a wet meadow lacking surface water. Vegetation composition included bluejoint reed grass (*Calamagrostis canadensis*) and three-leaved false Solomon's seal (*Maianthemum trifolium*).

The remaining 57 wetlands identified within the Assessment Area were wetland complexes, including bog-marsh, bog-swamp, fen-marsh, fen-swamp, and marsh-swamp complexes. These wetlands contained defined areas of each wetland type in one, contiguous wetland.

Predicted Wetland Mapping

Drone-assisted wet area modelling identified 153 PWLs either partially or fully within the Assessment Area (Drawing 9.3A to 9.3Q). These PWLs were classified based on aerial imagery and hydrology data as: treed swamp (43), shrub swamp (15), treed and shrub swamp (32), fen (3), bog (35), bog and swamp (19), and fen and swamp (6). Detailed characterization and functional assessment results were not collected for the PWLs. However, any PWLs determined to be impacted by the Project will be ground-truthed for boundaries, characteristics, and functionality prior to any alterations. Due to recent design iterations, some areas were not assessed through drone-assisted wet area modelling. These areas will be assessed in support of wetland permitting.

Functional Assessments

Functional assessments were completed in 2023 and 2024 by Strum wetland specialists for 336 wetlands within the Assessment Area. A summary is provided in Table 9.13. Where functional assessments have not yet been completed, these assessments will be completed in support of the permitting process.

Table 9.13: Summary of WESP-AC Assessments for Wetlands within the Assessment Area

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL1	4.94	10.00	9.24	3.11	5.15	2.43	4.84	7.68	7.69	9.68	N/A	4.78	N/A	4.96	6.37	6.09	No
WL2	7.88	8.46	9.47	4.16	7.09	3.14	5.25	7.67	8.68	9.76	N/A	10.00	N/A	7.14	7.67	7.19	No
WL3	8.96	10.00	8.13	4.39	5.44	0.52	1.44	2.50	5.92	7.28	N/A	4.78	N/A	8.05	5.98	5.36	No
WL4	7.64	4.40	9.38	3.35	4.74	2.53	5.53	5.08	5.80	6.51	N/A	5.65	N/A	7.23	6.62	4.96	No
WL5	2.30	10.00	4.25	3.34	8.54	6.75	6.36	3.71	8.54	5.23	N/A	8.26	N/A	7.31	6.00	6.37	No
WL6	0.00	4.29	2.27	2.73	6.94	5.76	4.41	5.16	7.83	7.01	N/A	5.36	N/A	4.77	4.29	5.01	No
WL7	1.54	5.24	3.73	3.12	4.48	1.76	2.45	7.57	7.66	9.69	N/A	8.26	N/A	6.16	3.97	5.97	No
WL8	5.92	3.44	9.24	1.75	7.23	2.60	3.87	3.98	8.89	4.37	N/A	6.52	N/A	8.32	7.03	4.43	No
WL9	1.74	10.00	4.30	9.87	9.00	5.59	4.24	7.66	8.19	7.49	N/A	8.26	N/A	7.23	5.49	8.01	No
WL10	7.55	8.74	9.40	2.21	5.11	2.63	4.21	7.68	8.20	9.72	N/A	8.26	N/A	7.35	6.89	6.66	No
WL11	6.27	8.01	9.30	4.14	4.86	2.74	4.66	7.64	8.40	7.54	N/A	7.10	N/A	8.13	5.80	3.92	No
WL12	5.56	7.78	8.80	2.83	4.89	0.93	2.73	3.71	6.36	3.84	N/A	8.26	N/A	7.26	5.67	4.94	No
WL13	1.98	3.44	2.56	3.99	7.89	6.03	5.91	3.17	7.15	2.88	N/A	8.26	N/A	8.96	5.10	5.25	No
WL14	5.67	10.00	9.29	4.83	4.25	3.67	5.66	7.75	8.80	9.78	N/A	8.26	N/A	5.77	6.73	7.15	No
WL15	8.36	4.79	8.17	3.77	4.88	0.40	0.27	1.81	6.85	6.62	N/A	6.52	N/A	6.09	5.71	4.29	No
WL16	5.50	4.83	8.29	3.77	5.96	2.87	4.39	5.22	8.27	7.14	N/A	7.10	N/A	5.64	6.48	5.22	No
WL17	8.39	5.11	8.05	3.98	5.36	0.58	1.60	1.32	6.87	4.84	N/A	8.26	N/A	7.86	6.05	4.56	No
WL18	0.37	9.31	3.38	4.22	7.98	5.64	4.34	4.00	8.48	9.17	N/A	6.52	N/A	6.09	4.91	6.42	No
WL19	7.07	4.68	9.35	2.01	6.36	2.67	5.35	7.59	7.46	9.64	N/A	5.65	N/A	7.14	7.12	5.63	No
WL20	2.06	4.34	4.20	3.49	8.48	6.20	6.81	5.22	8.46	6.95	N/A	8.26	N/A	8.04	6.00	6.07	No
WL21	9.20	7.44	8.27	3.11	4.96	0.42	0.43	2.60	6.45	9.53	N/A	8.26	N/A	7.18	5.86	5.51	No
WL22	1.07	3.10	2.96	9.33	8.37	4.79	3.80	3.82	8.19	8.98	N/A	8.26	N/A	7.82	4.88	6.59	No
WL23	1.20	8.35	2.13	5.98	6.05	5.68	4.38	2.91	8.13	5.09	N/A	3.03	N/A	8.00	4.38	5.58	No
WL24	2.91	3.21	3.35	3.91	5.38	4.73	5.69	3.64	6.41	6.59	N/A	6.52	N/A	7.92	4.75	5.22	No
WL25	6.48	10.00	9.12	5.52	4.26	2.86	5.72	2.66	6.49	4.38	N/A	5.36	N/A	8.39	6.41	5.60	No
WL26	1.87	3.44	2.32	4.85	7.19	5.15	5.35	3.75	6.22	6.58	N/A	8.26	N/A	9.15	4.59	5.88	No
WL27	3.75	3.33	2.92	2.80	5.91	4.38	4.90	7.54	5.79	8.72	N/A	5.36	N/A	7.71	4.65	5.69	No
WL28	1.15	5.92	2.89	3.63	8.27	5.55	5.97	5.28	8.40	7.10	N/A	7.10	N/A	7.74	5.34	6.05	No
WL29	0.94	10.00	1.88	7.65	6.79	5.47	4.75	3.20	5.62	8.72	N/A	6.52	N/A	8.37	4.00	7.13	No
WL30	1.85	5.64	2.80	9.88	7.14	4.55	6.45	4.95	1.94	1.48	N/A	6.52	N/A	5.89	4.04	5.56	No
WL31	1.52	2.93	3.24	3.22	6.99	4.58	5.67	5.10	5.77	6.51	N/A	2.75	N/A	7.47	4.64	4.65	No
WL32	5.73	3.27	8.03	3.75	5.33	2.23	4.92	7.53	6.23	8.76	N/A	7.10	N/A	6.82	6.05	5.64	No
WL33	1.80	9.19	3.09	4.09	6.12	5.00	5.29	3.91	8.00	4.11	N/A	7.10	N/A	8.22	4.86	5.95	No
WL35	0.94	4.46	3.16	2.71	6.92	6.03	5.16	2.59	1.12	1.48	N/A	5.36	N/A	8.47	3.46	4.44	No
WL36	8.33	10.00	7.96	5.77	6.60	0.78	1.79	1.12	7.80	4.86	N/A	10.00	N/A	8.27	6.69	4.15	No
WL37	8.53	4.09	8.04	3.77	5.90	0.79	1.82	1.93	7.27	6.63	N/A	8.26	N/A	6.35	6.31	4.55	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL38	7.24	4.23	7.52	3.77	5.91	0.68	1.65	1.84	7.46	6.63	N/A	6.52	N/A	6.43	5.96	4.30	No
WL39	3.75	3.27	3.63	3.22	6.01	4.49	5.30	5.09	6.02	6.52	N/A	5.36	N/A	8.05	4.94	5.14	No
WL40	2.27	3.27	3.17	3.22	6.14	4.41	5.19	5.08	5.78	6.51	N/A	6.52	N/A	6.48	4.51	5.07	No
WL41	1.23	5.92	3.11	4.22	8.18	4.99	4.74	5.14	8.11	6.74	N/A	7.10	N/A	5.94	5.07	5.72	No
WL43	5.52	3.27	9.16	2.63	3.78	3.19	4.95	3.21	7.64	4.83	N/A	8.84	N/A	6.92	6.21	4.70	No
WL44	9.06	3.40	8.19	3.98	6.25	0.83	1.90	1.16	7.39	4.76	N/A	10.00	N/A	7.78	6.56	4.56	No
WL45	1.25	5.92	2.90	9.42	8.46	5.22	5.88	5.22	7.43	6.65	N/A	8.26	N/A	7.21	5.18	6.84	No
WL46	8.94	4.85	8.39	2.63	4.98	0.26	0.59	1.57	5.32	6.50	N/A	4.78	N/A	7.51	5.64	4.01	No
WL47	1.52	4.34	2.56	3.63	6.64	5.85	5.29	3.06	5.24	6.47	N/A	6.52	N/A	7.82	4.25	5.38	No
WL48	3.18	3.21	2.54	3.95	7.29	4.93	5.10	5.23	7.79	7.00	N/A	8.26	N/A	7.97	5.18	5.79	No
WL49	8.05	7.22	7.48	3.22	7.03	0.72	1.74	1.86	8.26	6.80	N/A	8.26	N/A	7.30	6.51	5.05	No
WL50	1.48	4.57	2.46	5.93	7.04	6.06	4.08	3.70	7.24	6.66	N/A	7.10	N/A	9.05	4.46	6.15	No
WL51	8.80	7.22	8.09	3.61	5.79	5.19	1.88	1.89	6.99	6.62	N/A	7.10	N/A	7.18	6.31	5.54	No
WL52	0.00	8.91	3.10	4.17	7.08	6.85	3.95	5.16	7.83	6.97	N/A	8.26	N/A	8.71	4.39	7.00	No
WL53	4.64	4.96	3.66	2.80	5.86	5.98	4.85	5.13	7.00	6.64	N/A	3.33	N/A	7.69	5.20	5.22	No
WL54	1.39	6.37	2.33	9.59	6.50	5.43	6.64	7.40	2.54	2.22	N/A	0.00	N/A	6.85	3.88	5.41	No
WL55	8.24	3.67	9.55	3.94	5.28	3.06	5.45	5.16	6.97	6.63	N/A	3.04	N/A	8.81	7.10	4.90	No
WL56	7.94	8.85	7.55	4.21	5.89	0.36	1.37	2.33	6.61	9.52	N/A	8.26	N/A	8.81	5.87	6.05	No
WL57	9.89	5.47	8.72	1.81	5.29	0.50	0.65	1.84	6.64	6.54	N/A	6.52	N/A	6.55	6.24	4.18	No
WL58	8.78	3.72	8.10	4.18	5.62	0.50	1.80	1.60	6.66	6.58	N/A	8.26	N/A	7.83	6.19	4.67	No
WL59	8.92	3.67	8.13	3.07	6.17	0.01	0.14	1.38	3.91	6.33	N/A	3.04	N/A	6.58	5.45	3.44	No
WL60	0.88	3.89	3.06	3.40	5.85	5.34	3.83	5.11	7.12	6.67	N/A	8.26	N/A	8.04	4.15	5.82	No
WL61	6.04	4.40	9.47	2.59	5.84	2.30	4.13	7.67	7.28	9.67	N/A	8.26	N/A	7.51	6.55	6.06	No
WL62	1.78	4.34	4.51	9.31	7.60	5.87	4.40	7.60	7.07	9.58	N/A	10.00	N/A	7.62	5.07	7.76	No
WL63	4.30	6.88	3.99	4.00	5.15	4.68	1.58	1.33	6.71	3.99	N/A	3.62	N/A	5.88	4.35	4.34	No
WL64	6.64	3.52	8.80	2.81	4.15	2.90	4.39	3.05	8.14	5.18	N/A	4.78	N/A	6.81	6.42	4.15	No
WL65	1.91	4.68	5.29	3.70	6.95	6.05	4.90	5.24	8.36	7.03	N/A	10.00	N/A	5.93	5.48	6.09	No
WL66	7.00	4.85	9.45	2.59	3.57	2.80	4.72	3.21	7.45	4.93	N/A	3.04	N/A	6.28	6.44	3.96	No
WL67	5.48	6.94	8.83	4.00	5.16	2.06	4.18	3.84	6.27	4.69	N/A	7.10	N/A	4.92	5.98	4.79	No
WL68	2.92	10.00	4.84	4.18	6.71	6.03	4.76	7.69	7.45	9.66	N/A	8.26	N/A	6.89	5.34	7.53	No
WL69	9.08	7.09	7.81	3.71	6.22	0.59	1.58	2.55	6.45	8.05	N/A	7.10	N/A	8.00	6.23	5.30	No
WL70	0.95	8.52	4.44	9.44	8.95	6.18	4.09	5.19	7.85	6.94	N/A	8.26	N/A	7.85	5.26	7.48	No
WL71	9.47	6.49	8.20	3.17	4.85	0.70	1.57	1.07	7.77	4.82	N/A	8.84	N/A	8.07	6.37	4.74	No
WL72	9.47	6.50	8.14	3.71	5.31	0.77	1.48	1.17	8.59	5.11	N/A	10.00	N/A	8.07	6.60	5.05	No
WL73	1.98	4.29	4.67	9.24	6.69	5.35	3.65	5.19	7.85	6.85	N/A	8.26	N/A	7.63	4.97	6.69	No
WL74	7.93	5.19	7.48	3.19	6.49	0.69	1.83	1.41	6.93	4.90	N/A	7.10	7.17	4.08	6.13	3.79	No
WL75	8.94	5.26	8.14	3.61	6.22	0.75	1.83	1.48	6.79	4.83	N/A	8.26	N/A	9.02	6.38	4.74	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL76	1.45	8.57	2.83	3.90	7.32	5.78	4.74	5.19	7.07	6.67	N/A	3.04	N/A	9.84	4.68	6.14	No
WL78	1.57	8.40	3.46	9.68	7.55	6.29	7.48	4.10	8.92	5.45	N/A	3.04	N/A	7.73	5.80	6.38	No
WL79	9.21	9.79	8.28	3.55	5.94	0.41	1.39	1.17	5.06	4.62	N/A	8.26	N/A	7.18	5.98	5.00	No
WL80	8.68	9.81	8.14	4.48	4.54	0.25	1.23	1.02	4.59	4.58	N/A	3.04	N/A	7.18	5.44	4.34	No
WL81	9.18	9.76	7.98	3.55	5.49	0.37	1.43	1.11	4.92	4.61	N/A	5.36	N/A	7.18	5.80	4.56	No
WL82	2.46	8.52	3.86	4.55	6.65	5.07	5.21	3.96	8.55	5.17	N/A	5.65	N/A	6.57	5.35	5.64	No
WL83	8.93	8.75	7.83	4.55	6.33	0.83	1.91	1.15	7.03	8.89	N/A	4.78	N/A	7.47	6.41	5.20	No
WL84	8.35	4.61	8.13	2.66	5.46	0.83	1.90	1.96	7.14	6.62	N/A	6.52	N/A	7.17	6.20	4.34	No
WL85	8.43	3.27	7.79	2.32	5.52	0.80	1.99	1.10	6.94	4.72	N/A	7.10	N/A	7.81	6.13	3.87	No
WL86	2.07	8.63	3.53	4.06	5.09	4.45	0.40	2.17	4.75	9.39	N/A	1.88	N/A	7.46	3.17	5.43	No
WL87	8.51	6.09	7.76	4.00	6.45	0.57	0.58	1.12	7.04	4.58	N/A	8.26	N/A	5.74	6.07	4.34	No
WL88	8.69	6.32	8.21	4.13	5.46	0.68	1.79	1.40	6.65	4.84	N/A	8.26	N/A	7.21	6.16	4.69	No
WL89	8.69	6.20	8.32	4.13	4.93	0.60	1.66	1.34	7.07	4.97	N/A	4.78	N/A	6.96	6.13	4.14	No
WL90	8.24	3.55	7.92	2.79	7.06	0.26	1.27	1.43	5.97	6.51	N/A	6.52	N/A	7.96	6.09	4.15	No
WL91	8.45	3.33	9.55	2.53	5.33	2.68	5.09	5.19	7.86	6.76	N/A	8.26	N/A	8.16	7.26	5.27	No
WL92	7.90	3.95	7.53	1.91	4.62	0.22	0.34	1.57	6.05	6.55	N/A	3.04	N/A	7.27	5.29	3.50	No
WL93	8.65	3.33	8.07	2.52	7.19	0.36	1.58	1.48	5.16	6.45	N/A	6.52	N/A	7.34	6.13	4.00	No
WL94	8.51	3.27	7.92	2.79	7.07	0.48	1.69	1.59	5.30	6.48	N/A	4.78	N/A	7.96	6.10	3.91	No
WL95	8.51	3.44	7.83	3.33	5.03	0.46	1.66	1.58	5.30	6.49	N/A	3.62	N/A	7.96	5.67	3.84	No
WL96	8.94	4.00	8.20	3.07	6.48	0.63	1.84	2.56	6.32	9.54	N/A	8.26	N/A	7.21	6.36	5.04	No
WL97	8.51	4.68	7.92	3.33	5.54	0.68	2.01	1.76	5.95	6.53	N/A	4.78	N/A	7.96	5.99	4.25	No
WL98	7.94	5.53	7.84	1.78	6.49	0.44	1.66	1.55	5.19	6.48	N/A	4.78	N/A	7.05	5.82	3.94	No
WL99	5.56	5.02	9.39	1.78	6.71	2.72	4.81	3.67	8.18	6.92	N/A	10.00	N/A	5.87	6.93	5.14	No
WL100	8.49	3.95	7.97	3.52	4.20	0.73	1.58	1.91	8.02	6.74	N/A	6.52	N/A	7.99	6.05	4.48	No
WL101	8.92	5.47	8.30	2.56	5.14	0.57	1.92	1.66	6.42	6.57	N/A	3.04	N/A	7.99	6.14	3.98	No
WL102	6.52	5.41	9.52	2.49	4.27	2.52	4.33	5.20	7.19	6.79	N/A	8.26	N/A	6.07	6.37	5.25	No
WL103	8.25	5.41	8.05	2.66	5.80	0.52	1.79	1.63	6.94	6.60	N/A	6.52	N/A	7.34	6.17	4.38	No
WL104	7.44	5.47	9.35	3.12	4.81	3.15	4.86	7.68	7.41	8.89	N/A	6.52	N/A	8.10	6.77	6.13	No
WL105	8.49	3.95	7.97	3.77	4.49	0.74	1.70	1.90	7.16	6.61	N/A	6.52	N/A	7.34	5.96	4.40	No
WL106	2.80	9.23	3.98	9.66	8.58	8.22	7.15	3.70	9.51	5.51	N/A	10.00	N/A	4.10	6.40	7.20	No
WL107	8.49	3.95	7.97	3.77	4.49	0.73	1.68	1.90	7.16	6.61	N/A	6.52	N/A	7.34	5.96	4.40	No
WL108	1.58	8.06	2.46	9.50	6.55	6.58	4.41	5.33	7.41	9.64	N/A	8.26	N/A	7.50	4.48	7.84	No
WL109	6.95	3.55	9.19	4.18	4.19	2.50	4.92	7.63	6.69	8.83	N/A	6.52	N/A	8.15	6.39	5.91	No
WL110	8.93	7.92	7.80	5.74	5.69	0.91	2.08	1.21	7.27	4.64	N/A	3.62	N/A	7.31	6.35	4.48	No
WL111	7.93	5.08	7.85	1.78	6.68	0.57	1.75	2.50	6.55	9.54	N/A	8.26	N/A	7.37	6.15	5.01	No
WL112	8.52	7.33	8.30	3.11	4.66	0.53	0.42	1.12	7.11	4.59	N/A	6.52	N/A	7.08	5.80	4.33	No
WL113	8.21	6.45	7.81	3.11	7.14	0.69	0.88	1.21	7.72	4.90	N/A	8.84	N/A	6.81	6.35	4.57	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL114	0.99	10.00	1.49	5.20	6.48	9.31	9.03	4.23	1.23	0.74	N/A	4.78	N/A	6.19	3.84	5.78	No
WL115	0.71	7.73	2.39	5.82	8.25	7.03	7.06	3.91	7.41	4.80	N/A	7.39	N/A	5.85	5.16	6.08	No
WL116	9.07	8.97	8.37	3.55	5.95	0.52	1.44	2.50	6.95	9.56	N/A	6.52	N/A	7.37	6.36	5.57	No
WL117	8.51	3.67	7.82	2.84	6.96	0.46	1.63	1.58	6.38	6.56	N/A	8.26	N/A	6.77	6.26	4.31	No
WL118	7.76	3.55	7.69	3.33	3.85	0.41	1.43	2.38	6.17	9.52	N/A	3.62	N/A	7.86	5.38	4.38	No
WL119	5.92	5.87	9.00	4.60	3.66	2.93	5.38	5.20	7.08	6.66	N/A	8.26	N/A	9.39	6.21	6.13	No
WL120	5.92	3.98	8.75	1.75	4.53	1.09	3.05	3.72	5.80	4.57	N/A	10.00	N/A	4.80	5.61	4.27	No
WL121	6.95	4.00	9.32	2.63	5.47	3.50	5.70	4.35	8.64	5.58	N/A	10.00	N/A	6.16	7.22	5.17	No
WL122	8.51	3.67	8.08	2.66	5.90	0.27	1.36	2.22	5.24	8.68	N/A	8.26	N/A	7.34	5.82	4.73	No
WL123	5.49	3.27	7.56	3.46	3.06	0.60	2.56	7.36	3.00	8.44	N/A	4.78	N/A	7.79	4.33	5.10	No
WL124	9.19	4.20	8.22	1.78	6.75	0.53	0.52	1.50	6.80	4.75	N/A	8.26	N/A	5.38	6.30	3.77	No
WL125	8.51	3.38	8.02	3.77	7.05	0.29	1.37	2.25	4.66	8.65	N/A	4.78	N/A	6.49	5.92	4.23	No
WL126	0.00	5.55	0.77	5.66	6.15	3.28	3.27	1.87	5.66	3.74	N/A	7.39	N/A	6.08	3.17	4.80	No
WL127	9.47	4.06	8.30	1.78	6.64	0.67	0.73	1.22	7.08	4.50	N/A	6.52	N/A	4.93	6.44	3.38	No
WL128	8.24	3.10	7.84	2.66	6.98	0.45	1.69	1.56	4.96	6.45	N/A	3.04	N/A	7.34	5.94	3.51	No
WL129	8.51	7.33	7.98	3.98	7.31	0.56	1.83	1.66	5.93	6.52	N/A	8.26	N/A	8.22	6.31	5.22	No
WL130	8.66	6.65	8.26	4.13	4.97	0.70	1.77	1.03	6.64	4.51	N/A	6.52	N/A	6.89	6.06	4.35	No
WL131	0.14	2.71	3.13	3.33	7.03	4.30	4.09	7.66	7.49	9.68	N/A	4.78	N/A	6.95	4.38	5.63	No
WL132	9.78	6.20	8.68	10.00	7.03	0.42	1.69	1.53	5.12	6.46	N/A	4.78	N/A	7.31	6.46	5.24	No
WL133	8.24	2.71	7.82	2.79	7.18	0.43	1.69	2.35	5.05	9.43	N/A	6.52	N/A	8.08	6.00	4.62	No
WL134	8.51	2.65	8.08	3.33	6.93	0.42	1.59	1.54	5.93	6.53	N/A	4.78	N/A	7.99	6.21	3.89	No
WL135	0.00	1.02	2.66	3.77	7.36	3.25	3.69	7.63	7.50	9.65	N/A	4.78	N/A	7.18	4.24	5.33	No
WL136	8.66	6.65	8.26	4.13	5.12	0.80	1.85	1.13	7.06	4.60	N/A	6.52	N/A	7.21	6.19	4.43	No
WL137	7.49	2.48	7.54	2.66	6.49	0.45	1.73	2.36	5.06	9.43	N/A	6.52	N/A	7.36	5.66	4.47	No
WL138	8.79	4.00	7.82	4.18	5.11	0.74	1.95	1.85	6.63	6.60	N/A	5.36	N/A	8.00	6.06	4.39	No
WL139	8.24	4.29	9.46	1.83	4.47	2.67	3.89	3.13	8.61	5.43	N/A	10.00	N/A	5.01	6.93	4.62	No
WL140	8.79	4.06	8.06	3.79	7.20	0.98	2.01	2.12	8.99	7.12	N/A	8.84	N/A	8.16	7.01	5.01	No
WL141	9.47	6.49	8.20	3.11	7.20	0.88	2.08	1.17	7.17	4.61	N/A	10.00	N/A	6.65	6.82	4.70	No
WL142	0.92	3.95	3.44	3.80	8.03	7.70	8.12	4.55	7.62	5.18	N/A	8.26	N/A	6.35	5.63	5.68	No
WL143	6.04	10.00	9.04	5.91	4.21	3.33	6.40	4.00	6.27	4.72	N/A	4.78	N/A	9.15	6.39	5.98	No
WL144	0.89	9.64	3.75	4.99	8.37	4.73	4.87	5.22	7.44	6.78	N/A	4.78	N/A	8.36	5.06	6.36	No
WL145	3.83	5.21	3.72	4.47	6.52	6.32	7.58	5.48	8.14	5.42	N/A	5.36	N/A	7.39	5.96	5.66	No
WL146	9.22	4.79	8.01	1.78	4.97	0.63	0.72	1.17	7.57	4.86	N/A	8.26	N/A	6.22	6.10	3.96	No
WL147	7.91	7.47	7.79	3.11	5.94	0.53	0.69	1.06	6.61	4.43	N/A	6.52	N/A	7.03	5.79	4.31	No
WL148	9.05	10.00	8.00	9.83	6.06	0.62	0.78	1.15	7.64	8.89	N/A	6.52	N/A	7.35	6.31	6.34	No
WL149	8.04	10.00	7.34	4.77	5.54	0.86	2.05	1.15	8.32	8.89	N/A	8.26	N/A	7.94	6.26	5.98	No
WL150	8.93	1.52	8.20	5.95	6.25	0.51	1.50	2.48	6.71	9.54	N/A	8.26	N/A	8.47	6.32	5.25	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL151	2.73	10.00	4.06	9.83	6.95	2.71	2.29	1.16	8.68	8.89	N/A	7.10	N/A	7.22	4.94	6.70	No
WL152	9.19	6.26	8.03	3.11	5.43	0.70	1.84	1.42	6.94	4.90	N/A	8.26	N/A	7.09	6.29	4.53	No
WL153	3.81	5.13	4.66	4.96	4.83	3.19	1.55	0.87	7.10	4.56	N/A	4.20	N/A	6.32	4.39	4.18	No
WL154	6.46	4.37	9.22	3.16	4.03	3.62	5.59	3.35	7.83	4.94	N/A	5.36	N/A	6.68	6.63	4.50	No
WL155	2.43	3.27	2.77	3.63	6.44	4.72	5.76	5.14	5.90	6.51	N/A	0.43	N/A	7.99	4.66	4.53	No
WL156	8.24	1.58	7.83	4.17	5.66	0.43	1.73	1.53	4.92	6.44	N/A	3.04	N/A	8.21	5.68	3.63	No
WL157	8.65	1.52	8.02	5.95	6.49	0.30	1.29	2.28	4.53	9.35	N/A	3.04	N/A	8.12	5.80	4.37	No
WL158	8.77	1.30	8.13	3.33	5.42	0.54	1.78	2.45	6.76	9.55	N/A	8.26	N/A	7.96	6.17	4.77	No
WL159	8.94	1.52	8.31	1.78	5.91	0.59	1.85	2.50	6.87	9.56	N/A	8.26	N/A	7.24	6.38	4.49	No
WL160	7.79	9.42	7.21	4.49	5.33	0.94	1.99	2.08	8.57	7.04	N/A	7.10	N/A	8.86	6.18	5.70	No
WL161	2.76	1.35	2.68	3.33	5.96	3.30	4.39	5.37	7.84	9.68	N/A	5.36	N/A	7.83	4.73	5.17	No
WL162	1.26	9.08	3.67	9.62	7.95	7.59	7.39	3.59	8.82	5.19	N/A	10.00	N/A	6.44	5.82	7.36	No
WL163	9.89	6.49	8.41	2.22	6.51	0.89	1.95	1.62	8.10	5.31	N/A	10.00	N/A	7.26	6.97	4.83	No
WL164	8.77	1.64	8.14	3.33	5.74	0.46	1.60	2.40	5.57	9.47	N/A	8.26	N/A	7.96	5.96	4.79	No
WL165	7.95	7.11	8.70	4.38	5.40	4.74	7.51	4.03	7.36	8.89	N/A	4.78	N/A	7.21	7.38	5.88	No
WL166	8.51	10.00	7.55	5.88	6.31	0.77	1.98	2.68	6.61	9.53	N/A	4.78	N/A	6.21	6.19	5.69	No
WL167	1.56	5.87	2.99	4.05	7.63	7.22	6.76	4.38	7.22	4.58	N/A	7.10	N/A	7.13	5.23	5.76	No
WL168	8.49	2.09	7.95	2.78	6.05	0.22	0.43	2.36	5.09	9.43	N/A	6.52	N/A	7.92	5.60	4.47	No
WL170	4.37	6.43	3.26	4.22	5.74	5.98	5.61	3.80	8.98	5.42	N/A	7.10	N/A	6.13	5.59	5.58	No
WL171	6.48	5.70	9.21	3.11	5.26	3.04	4.74	3.29	8.37	5.31	N/A	8.26	N/A	7.14	6.81	5.12	No
WL172	0.69	9.81	0.78	4.72	4.77	2.40	3.40	2.52	6.65	3.99	N/A	6.52	N/A	8.24	3.26	5.46	No
WL173	7.22	7.22	8.78	4.89	5.16	3.75	6.28	5.32	8.77	9.44	N/A	4.78	N/A	5.55	7.24	5.85	No
WL174	7.79	2.20	7.35	2.80	5.73	0.31	0.62	2.43	6.95	9.57	N/A	8.84	N/A	7.98	5.69	4.88	No
WL175	7.51	2.20	7.29	2.80	5.94	0.07	0.13	2.26	4.46	9.36	N/A	4.78	N/A	7.59	5.07	4.15	No
WL176	2.13	6.65	2.41	4.78	6.54	7.23	5.70	4.57	6.74	4.60	N/A	5.36	N/A	6.63	4.70	5.69	No
WL177	4.24	1.47	2.98	5.63	6.86	3.43	4.17	5.19	7.64	9.44	N/A	3.62	N/A	8.88	5.18	5.38	No
WL178	9.05	2.31	7.95	6.05	5.70	0.13	0.18	2.32	5.34	9.45	N/A	9.17	N/A	4.20	5.64	4.80	No
WL179	8.95	5.87	8.24	3.11	7.22	0.83	1.98	1.14	6.99	4.63	N/A	8.26	N/A	6.86	6.68	4.39	No
WL180	8.49	1.75	7.79	3.33	4.84	0.36	1.50	1.50	5.19	6.46	N/A	6.52	N/A	8.16	5.56	4.01	No
WL181	8.02	6.16	9.15	4.64	4.69	3.42	5.16	5.25	8.39	5.53	N/A	5.36	N/A	7.49	7.08	5.41	No
WL182	2.13	6.65	3.22	3.63	6.51	7.59	5.85	5.13	8.46	5.55	N/A	3.62	N/A	6.40	5.23	5.51	No
WL183	8.92	3.21	8.16	1.78	7.05	0.82	2.01	1.12	7.37	4.81	N/A	6.52	N/A	7.14	6.70	3.63	No
WL184	8.51	2.88	7.83	5.95	6.57	0.76	1.73	1.11	6.49	4.29	N/A	3.04	N/A	6.35	6.23	3.48	No
WL185	7.02	2.88	9.00	3.22	3.93	3.42	5.42	3.97	8.35	5.12	N/A	3.62	N/A	4.42	6.74	3.81	No
WL186	7.79	2.88	7.43	3.19	6.05	0.74	1.71	1.09	7.58	4.79	N/A	7.10	N/A	8.80	6.11	4.08	No
WL187	1.45	1.47	2.64	7.22	7.21	4.08	5.04	3.94	7.47	9.17	N/A	7.10	N/A	8.39	4.76	5.91	No
WL188	9.19	7.50	8.28	4.13	6.02	0.60	0.80	1.12	7.01	4.69	N/A	8.26	N/A	7.21	6.26	4.79	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL189	7.79	3.05	7.35	2.76	5.96	0.88	2.20	1.15	7.34	4.79	N/A	7.10	N/A	5.78	6.13	3.64	No
WL190	2.52	2.93	2.62	2.80	6.58	5.63	5.94	4.96	8.55	5.60	N/A	7.10	N/A	5.09	5.24	4.87	No
WL191	5.20	7.78	8.88	3.06	3.24	0.94	2.91	2.50	6.41	3.86	N/A	6.52	N/A	4.56	5.33	4.17	No
WL192	8.04	3.05	7.76	2.76	5.60	0.59	0.67	1.14	7.64	4.83	N/A	7.10	N/A	7.86	5.94	3.90	No
WL193	3.11	3.16	4.48	2.80	6.23	5.79	6.09	3.83	9.10	5.51	N/A	7.10	N/A	5.93	5.80	4.87	No
WL194	0.41	7.67	4.74	4.41	8.46	4.06	5.33	4.33	8.93	9.17	N/A	6.52	N/A	7.10	5.57	6.18	No
WL195	8.51	2.54	8.11	3.77	7.30	0.48	1.67	1.60	6.73	6.57	N/A	8.26	N/A	7.88	6.46	4.44	No
WL196	1.64	2.59	4.59	5.91	7.85	5.55	5.68	6.65	8.23	8.89	N/A	4.78	N/A	8.29	5.60	6.09	No
WL198	2.04	7.90	3.36	3.14	7.68	6.65	3.93	3.19	9.00	5.55	N/A	10.00	N/A	5.50	5.20	5.99	No
WL199	8.49	6.60	8.00	3.62	4.83	0.44	1.61	1.56	5.71	6.51	N/A	3.04	N/A	8.11	5.73	4.27	No
WL201	9.08	6.49	8.09	3.11	6.01	0.61	0.72	1.15	7.21	4.72	N/A	8.26	N/A	6.78	6.22	4.45	No
WL202	0.11	8.88	3.13	5.18	7.52	6.39	3.88	4.26	9.00	5.43	N/A	5.65	N/A	4.58	4.73	5.77	No
WL203	1.41	3.72	3.78	3.32	8.28	7.10	6.48	3.77	8.77	5.31	N/A	8.26	N/A	6.11	5.74	5.37	No
WL204	5.92	2.31	9.23	2.89	4.53	3.12	5.32	7.71	8.07	9.75	N/A	8.84	N/A	8.70	6.61	6.19	No
WL206	4.48	5.87	5.34	5.51	6.66	3.92	0.74	1.15	7.39	4.79	N/A	5.65	N/A	7.00	4.92	4.84	No
WL207	6.68	7.22	9.15	3.63	5.23	3.01	4.53	3.24	8.50	5.33	N/A	8.26	N/A	7.18	6.82	5.41	No
WL208	2.55	7.20	2.77	3.63	7.05	5.66	4.39	3.18	8.08	5.16	N/A	4.78	N/A	5.76	4.97	5.05	No
WL209	8.80	3.33	8.04	1.89	6.00	0.87	1.98	1.18	7.59	4.89	N/A	6.52	N/A	7.56	6.48	3.75	No
WL210	6.07	5.24	9.47	3.99	6.35	2.86	4.78	4.10	8.53	9.17	N/A	3.04	N/A	6.60	7.04	5.00	No
WL211	8.66	6.97	8.03	3.11	7.04	0.73	1.76	1.47	7.39	9.17	N/A	6.52	N/A	7.18	6.58	5.02	No
WL212	9.19	5.87	8.29	4.23	8.50	0.63	0.81	1.15	7.47	4.74	N/A	8.26	N/A	7.18	6.85	4.58	No
WL213	7.79	7.40	7.75	3.61	5.86	0.59	0.66	1.13	6.86	4.54	N/A	4.78	N/A	6.99	5.78	4.15	No
WL214	7.17	7.39	7.22	3.61	5.74	0.86	1.96	1.18	7.07	4.60	N/A	4.78	N/A	5.58	5.83	4.00	No
WL215	8.80	3.33	7.77	3.07	4.38	0.52	0.54	1.08	6.55	4.44	N/A	3.04	N/A	7.16	5.61	3.23	No
WL216	9.18	7.39	8.24	3.61	4.96	0.56	0.70	1.09	6.82	4.54	N/A	4.78	N/A	7.06	5.98	4.15	No
WL217	8.77	2.37	8.13	2.79	5.83	0.55	1.71	2.48	6.10	9.52	N/A	8.26	N/A	7.99	6.11	4.85	No
WL218	8.77	2.37	8.13	2.79	5.83	0.55	1.71	2.48	6.10	9.52	N/A	8.26	N/A	7.99	6.11	4.85	No
WL219	8.92	5.93	7.90	4.46	6.04	0.97	3.17	1.05	6.71	4.56	N/A	6.52	N/A	7.46	6.55	4.42	No
WL220	7.68	9.62	7.52	4.46	7.10	1.01	2.15	1.31	8.38	5.15	N/A	8.26	N/A	7.79	6.57	5.37	No
WL221	8.38	5.19	8.08	4.00	5.82	3.22	1.55	1.36	7.59	5.05	N/A	8.26	N/A	7.01	6.28	4.87	No
WL222	9.19	7.11	8.27	4.30	6.58	0.96	2.11	1.26	8.27	5.10	N/A	8.26	N/A	8.12	6.88	5.02	No
WL223	6.44	2.59	9.37	2.62	5.82	2.69	4.36	7.69	7.81	9.70	N/A	3.04	N/A	8.41	6.76	5.25	No
WL224	0.91	7.50	2.11	9.85	6.83	3.60	4.30	3.02	8.00	8.89	N/A	4.78	N/A	8.09	4.43	6.53	No
WL225	8.79	7.76	7.98	4.04	5.55	0.82	2.03	1.11	7.52	8.89	N/A	5.36	N/A	8.34	6.37	5.19	No
WL226	9.19	10.00	8.22	4.11	5.34	0.77	1.65	1.54	7.79	5.14	N/A	8.26	N/A	8.77	6.44	5.51	No
WL227	2.65	4.96	5.18	4.00	6.59	3.13	1.77	0.89	5.89	8.89	N/A	6.52	N/A	7.80	4.42	5.17	No
WL228	1.49	6.85	3.30	3.16	6.54	5.85	5.31	4.24	8.83	5.68	N/A	3.62	N/A	7.27	5.09	5.24	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL229	2.96	7.35	5.94	3.85	5.94	5.29	1.74	0.97	6.47	8.89	N/A	6.52	N/A	8.62	4.61	5.93	No
WL230	7.77	8.23	7.51	2.88	6.60	0.82	1.92	1.13	7.18	4.63	N/A	8.26	N/A	6.37	6.20	4.62	No
WL231	5.57	10.00	4.08	7.66	8.73	4.98	2.10	1.18	7.24	4.73	N/A	3.62	N/A	6.10	5.54	5.47	No
WL232	8.25	8.03	7.85	2.88	5.69	0.65	1.90	0.94	6.08	4.28	N/A	3.04	N/A	6.34	5.95	3.74	No
WL233	7.52	8.01	7.46	2.88	6.39	0.69	1.97	0.97	6.28	4.37	N/A	4.78	N/A	6.58	5.92	4.04	No
WL234	9.20	3.59	8.34	1.78	7.28	0.83	2.12	1.11	7.53	4.86	N/A	8.26	N/A	7.17	6.89	3.94	No
WL235	8.92	8.80	8.13	5.18	5.87	0.75	0.89	1.28	7.38	4.59	N/A	3.04	N/A	7.21	6.24	4.41	No
WL236	8.53	4.06	7.87	3.33	5.45	0.76	1.83	1.49	7.71	5.10	N/A	7.10	N/A	7.83	6.28	4.24	No
WL237	8.66	7.25	8.23	3.11	5.53	0.47	0.46	1.43	6.78	4.80	N/A	4.78	N/A	7.31	5.93	4.16	No
WL238	5.39	8.91	8.66	4.04	6.01	3.62	6.11	4.96	8.23	5.35	N/A	1.88	N/A	7.66	6.88	5.20	No
WL239	8.92	5.98	8.21	3.11	6.91	0.70	0.77	1.24	7.61	4.66	N/A	6.52	N/A	6.83	6.48	4.15	No
WL240	7.29	6.03	9.10	3.06	4.27	3.02	5.05	2.95	8.88	5.16	N/A	7.10	N/A	4.61	6.92	4.56	No
WL241	8.67	4.17	8.01	3.36	5.30	0.86	1.78	1.62	7.52	5.12	N/A	3.04	N/A	7.79	6.26	3.71	No
WL242	8.92	4.17	8.00	5.40	8.34	0.87	1.81	1.63	7.36	4.87	N/A	3.04	N/A	5.78	6.89	3.68	No
WL244	8.80	8.85	8.21	4.51	5.52	0.59	1.67	0.93	6.51	4.50	N/A	4.78	N/A	8.82	6.14	4.71	No
WL245	0.58	4.28	3.71	3.06	8.79	7.26	7.09	3.85	9.16	5.45	N/A	8.26	N/A	5.70	5.87	5.41	No
WL246	2.23	4.23	1.09	3.57	5.40	3.33	5.27	2.78	5.73	3.76	N/A	4.78	N/A	4.79	3.94	3.89	No
WL247	9.22	3.22	8.14	2.06	7.01	0.91	1.92	1.65	8.97	5.51	N/A	8.84	N/A	7.32	7.05	4.22	No
WL248	9.34	3.88	8.11	3.63	6.47	0.91	2.03	1.63	7.76	5.19	N/A	7.10	N/A	7.18	6.74	4.22	No
WL249	8.04	4.25	7.66	3.11	6.56	0.96	1.99	1.29	7.76	4.82	N/A	8.26	N/A	7.44	6.40	4.30	No
WL250	9.19	4.46	8.24	3.11	5.06	0.58	0.62	1.13	7.16	4.66	N/A	8.26	N/A	9.02	6.05	4.46	No
WL251	8.80	8.78	8.05	4.51	5.88	0.74	1.79	1.07	6.68	4.48	N/A	4.78	N/A	8.18	6.24	4.65	No
WL252	9.05	8.78	8.29	4.51	5.64	0.68	1.71	1.01	7.20	4.70	N/A	8.26	N/A	7.51	6.38	5.06	No
WL253	3.21	4.43	5.38	3.11	7.35	2.80	1.96	1.27	7.68	4.78	N/A	8.26	N/A	5.28	5.12	4.28	No
WL254	8.19	3.72	7.83	1.78	6.05	0.51	0.62	1.45	7.26	5.02	N/A	8.26	N/A	7.21	5.99	3.99	No
WL255	9.33	4.46	8.36	3.11	5.58	0.73	0.74	2.09	7.84	6.72	N/A	10.00	N/A	6.93	6.37	4.86	No
WL257	8.04	4.34	7.84	3.11	6.55	0.85	1.91	1.98	7.32	6.64	N/A	8.26	N/A	6.66	6.33	4.55	No
WL258	4.69	4.40	5.11	3.11	5.76	2.71	1.81	1.25	7.64	4.91	N/A	8.26	N/A	5.12	5.00	4.25	No
WL259	0.00	4.23	2.42	3.11	8.71	6.60	6.77	4.36	8.62	7.25	N/A	7.39	N/A	4.43	5.30	5.34	No
WL260	3.72	10.00	5.70	4.73	5.93	2.82	1.90	1.08	6.83	4.64	N/A	8.26	N/A	8.09	4.82	5.66	No
WL261	0.89	8.52	4.23	4.45	8.81	6.62	6.77	5.17	8.55	5.15	N/A	4.78	N/A	6.32	5.85	5.86	No
WL262	2.77	6.75	4.39	3.11	6.68	4.75	1.86	1.38	8.03	5.14	N/A	8.84	N/A	6.92	4.75	5.27	No
WL263	8.33	3.16	7.95	2.76	5.53	0.63	0.66	1.18	7.91	5.00	N/A	4.78	N/A	7.83	6.08	3.62	No
WL264	9.47	4.51	8.47	3.11	5.77	0.74	0.63	2.13	8.18	9.44	N/A	10.00	N/A	7.17	6.50	5.30	No
WL265	9.08	4.57	8.37	3.11	6.55	0.80	1.76	1.15	7.34	4.75	N/A	10.00	N/A	7.07	6.62	4.49	No
WL266	1.33	5.43	2.42	3.11	5.93	4.27	5.18	3.44	8.68	5.39	N/A	7.10	N/A	5.19	4.71	4.85	No
WL267	9.20	5.58	8.37	3.11	7.26	0.94	2.01	1.26	7.80	4.80	N/A	8.26	N/A	7.14	6.93	4.44	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL268	8.94	4.57	8.26	3.11	7.27	0.88	1.91	1.21	7.51	4.69	N/A	8.26	N/A	6.74	6.78	4.21	No
WL269	8.77	4.40	8.08	4.91	6.57	0.46	0.16	1.08	6.78	4.39	N/A	6.52	N/A	5.69	6.07	3.92	No
WL270	4.47	10.00	6.00	4.73	6.11	4.87	1.74	1.45	6.52	4.73	N/A	4.78	N/A	6.75	4.97	5.33	No
WL271	8.77	4.40	8.12	6.07	6.08	0.38	0.00	1.03	6.52	4.32	N/A	6.52	N/A	6.66	5.90	4.20	No
WL272	9.19	7.38	8.27	3.11	5.27	0.94	2.19	1.22	8.56	5.16	N/A	7.10	7.10	7.18	6.70	4.58	No
WL273	8.94	6.39	8.21	3.11	7.33	1.04	2.33	1.30	7.87	4.80	N/A	8.26	N/A	7.21	6.94	4.59	No
WL274	9.36	3.33	8.49	0.89	5.90	0.73	1.84	1.86	7.87	6.74	N/A	8.26	N/A	7.32	6.69	4.16	No
WL275	8.94	4.62	8.28	3.08	5.79	0.89	1.91	1.22	8.42	8.89	N/A	8.26	N/A	7.98	6.67	4.99	No
WL276	8.66	4.62	8.08	3.11	7.21	0.90	1.93	1.23	7.63	8.89	N/A	6.52	N/A	7.24	6.70	4.64	No
WL277	5.63	6.37	8.18	3.11	3.85	3.23	4.88	5.23	8.47	7.20	N/A	8.26	N/A	7.21	6.20	5.80	No
WL278	6.05	2.14	9.08	7.90	8.34	3.08	5.70	0.82	1.84	1.15	N/A	7.39	N/A	7.94	6.20	4.35	No
WL279	9.33	6.36	8.46	3.11	4.99	0.41	0.32	1.40	7.09	4.96	N/A	7.39	N/A	5.52	6.04	4.16	No
WL280	9.61	7.25	8.45	3.11	6.07	0.99	2.09	1.30	8.70	5.23	N/A	10.00	N/A	7.32	6.98	5.03	No
WL281	8.66	4.62	8.08	3.11	7.19	0.84	1.90	1.17	7.32	8.89	N/A	6.52	N/A	7.31	6.63	4.64	No
WL282	9.61	7.25	8.45	3.11	6.01	0.99	2.03	1.31	8.72	5.24	N/A	10.00	N/A	7.43	6.96	5.05	No
WL283	8.66	6.39	8.11	3.11	7.19	1.01	2.24	1.30	7.90	4.75	N/A	6.52	N/A	7.21	6.82	4.33	No
WL284	9.33	7.90	8.33	3.08	5.73	0.84	1.82	1.19	8.51	5.05	N/A	8.26	N/A	8.04	6.74	4.91	No
WL285	9.19	6.71	8.33	3.08	5.11	0.57	0.48	1.15	7.15	4.67	N/A	8.26	N/A	5.72	6.05	4.31	No
WL286	9.08	10.00	7.76	4.82	4.79	0.60	1.61	1.35	6.58	4.79	N/A	4.78	N/A	9.77	5.96	5.16	No
WL287	8.41	6.30	7.95	3.11	7.07	0.88	2.04	1.18	7.12	4.61	N/A	6.52	N/A	7.06	6.52	4.24	No
WL288	9.22	6.79	8.41	3.61	6.05	0.94	1.92	1.27	8.66	5.21	N/A	10.00	N/A	8.45	6.85	5.18	No
WL289	8.94	5.95	8.27	3.11	5.86	0.88	1.94	1.20	7.50	4.83	N/A	8.26	N/A	6.63	6.50	4.41	No
WL290	8.94	6.24	8.20	3.11	6.96	0.68	0.76	1.22	7.54	4.78	N/A	8.26	N/A	5.82	6.48	4.30	No
WL291	7.46	4.65	7.29	3.08	6.04	0.92	2.00	1.23	7.68	8.89	N/A	8.26	N/A	7.25	6.09	4.90	No
WL292	2.60	5.98	4.69	9.48	7.76	4.12	1.94	1.28	8.25	5.05	N/A	8.26	N/A	6.70	5.05	5.84	No
WL293	3.37	2.08	6.28	4.57	6.21	3.20	6.65	2.78	2.19	1.24	N/A	6.52	N/A	7.31	4.94	3.96	No
WL294	7.33	4.56	8.49	4.05	4.66	2.79	4.62	3.23	7.89	5.15	N/A	6.52	N/A	5.88	6.60	4.60	No
WL295	9.06	6.32	8.06	4.46	4.11	0.44	0.47	1.40	6.30	4.71	N/A	3.04	N/A	6.45	5.60	3.83	No
WL296	9.22	6.39	8.36	3.11	5.43	0.82	0.80	1.37	8.19	8.89	N/A	6.52	N/A	7.14	6.40	4.89	No
WL297	9.61	3.32	8.48	0.89	5.04	0.58	0.62	1.13	7.19	8.89	N/A	8.26	N/A	7.18	6.19	4.32	No
WL298	4.72	10.00	3.54	4.81	7.32	4.54	1.96	1.11	7.06	4.58	N/A	7.10	N/A	8.08	4.92	5.75	No
WL299	9.06	6.31	8.23	3.08	4.05	0.46	0.43	1.43	6.39	4.80	N/A	4.78	N/A	5.83	5.63	3.81	No
WL300	8.18	9.25	7.99	4.44	4.97	0.55	1.66	0.87	5.97	4.34	N/A	4.78	N/A	7.97	5.75	4.60	No
WL301	5.65	10.00	9.34	4.46	5.63	4.57	6.52	5.90	8.49	7.16	N/A	6.52	N/A	5.41	7.13	6.29	No
WL302	5.68	5.58	9.40	2.08	6.31	2.45	4.30	5.28	8.10	9.70	N/A	3.04	N/A	8.11	6.76	5.18	No
WL303	2.97	10.00	3.40	4.58	5.62	4.76	4.92	3.21	7.89	5.17	N/A	4.78	N/A	5.58	4.96	5.44	No
WL304	8.91	3.10	7.91	2.96	5.22	0.47	0.64	1.00	6.77	4.56	N/A	6.52	N/A	10.00	5.89	4.09	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL305	6.37	6.14	8.52	3.88	7.57	4.28	6.77	3.50	9.05	5.41	N/A	7.39	N/A	6.60	7.66	5.31	No
WL306	3.67	6.19	3.70	3.97	6.15	6.79	7.66	4.35	9.03	5.41	N/A	7.10	N/A	7.58	6.04	5.91	No
WL307	7.77	6.11	7.61	4.18	6.55	0.57	1.54	1.74	6.39	6.57	N/A	7.39	N/A	7.02	5.97	4.80	No
WL308	8.63	7.35	7.62	5.33	5.15	0.33	0.42	1.28	6.02	4.67	N/A	4.78	N/A	6.31	5.57	4.29	No
WL309	1.20	4.06	4.34	3.14	8.92	6.27	6.33	4.09	9.20	5.41	N/A	7.39	N/A	3.90	6.00	4.89	No
WL310	8.63	7.35	8.01	5.33	5.53	0.61	1.73	1.33	6.41	4.71	N/A	4.78	N/A	6.24	6.06	4.34	No
WL311	0.00	3.67	2.26	4.04	7.29	5.02	4.91	4.95	8.24	5.17	N/A	8.26	N/A	6.54	4.54	5.38	No
WL312	9.35	4.06	8.37	3.11	4.61	0.55	0.44	1.54	7.63	5.08	N/A	10.00	N/A	5.42	6.08	4.25	No
WL313	5.95	3.89	9.30	3.80	5.42	4.12	6.67	6.32	8.27	5.21	N/A	10.00	N/A	5.10	7.12	5.49	No
WL314	8.82	4.06	8.08	5.67	4.85	0.51	0.60	1.05	6.68	4.51	N/A	4.78	N/A	5.84	5.81	3.77	No
WL315	8.79	4.46	8.07	4.00	5.22	0.56	0.58	1.52	7.04	4.85	N/A	4.78	N/A	4.49	5.94	3.52	No
WL316	9.49	4.26	8.48	3.11	5.30	0.55	0.74	1.07	7.29	4.72	N/A	10.00	N/A	5.17	6.26	4.13	No
WL318	8.79	4.46	8.19	4.00	5.10	0.51	0.52	1.48	7.16	4.94	N/A	4.78	N/A	4.84	5.95	3.57	No
WL319	8.06	4.06	7.81	3.85	6.02	0.47	0.56	1.02	6.67	4.48	N/A	4.78	N/A	4.70	5.82	3.34	No
WL320	7.53	4.41	7.60	4.00	5.73	0.60	1.81	0.90	7.26	4.67	N/A	4.78	N/A	5.69	5.99	3.58	No
WL321	4.61	7.35	4.43	4.45	5.44	4.32	6.21	7.75	8.04	6.90	N/A	10.00	N/A	5.47	5.75	6.61	No
WL322	0.00	4.06	2.89	7.37	8.99	4.00	5.38	3.34	8.05	5.09	N/A	3.91	N/A	5.84	5.06	4.80	No
WL323	2.28	4.96	3.58	3.97	7.91	6.76	7.06	3.26	7.53	4.48	N/A	2.46	N/A	4.60	5.67	4.36	No
WL324	8.95	1.47	8.31	2.96	5.71	0.64	1.52	1.82	6.92	6.61	N/A	4.78	N/A	8.41	6.28	3.81	No
WL325	9.21	4.34	8.07	3.11	4.38	0.49	0.63	1.02	6.14	4.34	N/A	0.00	N/A	6.08	5.69	2.77	No
WL326	9.38	1.47	8.33	1.78	5.35	0.62	0.80	1.14	8.05	4.96	N/A	10.00	N/A	5.37	6.38	3.62	No
WL327	8.34	5.64	7.70	3.11	4.80	0.51	0.55	0.86	7.64	3.36	N/A	4.78	N/A	5.98	5.81	3.46	No
WL328	9.24	2.26	8.56	1.78	5.46	0.55	0.61	1.10	7.49	4.78	N/A	10.00	N/A	4.74	6.27	3.60	No
WL331	0.00	4.96	3.23	9.39	8.00	7.66	6.36	4.05	9.73	5.55	N/A	8.84	N/A	4.71	5.46	6.45	No
WL332	8.28	6.94	9.05	6.71	4.46	3.61	7.87	6.21	2.16	1.48	N/A	0.00	N/A	6.94	6.36	4.56	No
WL333	8.93	4.51	7.81	3.20	3.91	0.58	0.83	1.09	6.76	4.47	N/A	3.04	N/A	5.03	5.65	3.13	No
WL334	1.22	6.94	3.23	8.59	8.55	5.75	6.11	6.36	8.58	7.24	N/A	1.88	N/A	9.81	5.54	6.65	No
WL335	2.13	7.05	3.24	9.93	7.55	7.70	9.23	5.15	4.07	0.74	N/A	8.26	N/A	6.99	5.24	6.55	No
WL336	9.06	6.78	8.10	4.44	4.53	0.47	0.65	1.81	6.79	6.59	N/A	6.52	N/A	6.30	5.83	4.70	No
WL337	8.93	4.51	7.99	3.11	4.05	0.58	0.83	1.09	6.81	4.47	N/A	3.04	N/A	4.48	5.72	3.04	No
WL338	7.13	7.16	9.36	5.13	5.30	3.90	6.44	4.83	8.26	5.15	N/A	5.36	N/A	5.90	7.30	5.35	No
WL339	7.81	7.16	7.17	7.67	5.76	0.46	1.49	0.81	7.76	4.74	N/A	4.49	N/A	10.00	6.00	5.05	No
WL340	9.49	4.34	8.22	6.45	4.21	0.51	0.68	1.04	8.46	4.99	N/A	10.00	N/A	8.66	6.21	5.14	No
WL341	5.79	6.99	9.34	5.13	3.34	3.13	5.20	4.10	7.65	5.08	N/A	4.78	N/A	5.46	6.26	4.95	No
WL342	0.51	1.41	4.21	9.14	8.06	3.52	4.34	3.12	7.96	5.06	N/A	8.26	N/A	3.83	5.02	4.91	No
WL344	6.18	3.89	9.29	5.57	3.24	2.81	4.95	3.29	7.58	5.10	N/A	4.78	N/A	5.41	6.25	4.41	No
WL345	8.34	1.41	7.83	5.29	5.35	0.54	0.67	1.08	7.04	4.67	N/A	4.78	N/A	5.50	5.85	3.32	No

WL ID	Hydrologic Group		Water Quality Group		Aquatic Support Group		Aquatic Habitat Group		Transitional Habitat Group		Wetland Condition		Wetland Risk		Average Function	Average Benefits	WSS
	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits	Function	Benefits			
WL346	8.62	5.19	7.74	3.11	5.34	0.48	0.64	1.41	8.36	5.24	N/A	10.00	N/A	6.67	6.14	4.59	No
WL347	2.96	0.90	3.68	1.80	6.74	4.11	5.74	4.09	8.46	5.56	N/A	8.26	N/A	3.87	5.52	4.08	No
WL348	8.62	1.30	7.89	1.96	6.32	0.76	2.02	0.85	8.32	3.52	N/A	10.00	N/A	5.40	6.63	3.40	No
WL349	8.34	6.26	7.72	3.11	6.03	0.68	1.81	1.40	7.23	4.96	N/A	4.78	N/A	4.99	6.23	3.74	No
Grouped Function Scores by Rating (%)																	
Low	25.60	25.00	4.46	38.69	0.00	74.11	59.82	46.13	1.19	53.57	N/A	13.10	N/A	1.79			
Moderate	19.64	41.96	23.51	53.27	33.33	24.70	31.25	34.23	29.17	25.60	N/A	22.32	N/A	32.44			
High	54.76	33.04	72.02	8.04	66.67	1.19	8.93	19.64	69.64	20.83	N/A	64.58	N/A	65.77			

⁽¹⁾ Wetlands of Special Significance determination as dictated by the Functional WSS Interpretation Results within the WESP-AC spreadsheet calculator.
⁽²⁾ Ratings are represented by colours, where red corresponded to a 'lower' rating, yellow corresponds to a 'moderate' rating, and green corresponds to a 'higher' rating.

Hydrological Group

The hydrologic group evaluates the effectiveness of a wetland to store or delay the downslope movement of surface water. However, the model does not account for wetland size, and in turn, the ability of larger wetlands to store more water than smaller wetlands. Wetlands that have the highest benefit scores within this group tend to be located within developed areas, where water storage is more valuable to reduce flood risks.

The hydrological function score for wetlands was predominantly rated as high (55%), while the benefit scores were a mix of lower (25%), moderate (42%), and high (33%).

Water Quality Group

The water quality group is compiled from four different functions: sediment retention and stabilization; phosphorus retention; nitrate removal; carbon sequestration. The main function of this group is to evaluate the wetland's potential to intercept, retain, and filter sediments, particulates, and organic matter. Similar to the hydrologic group, the wetlands that have the higher benefit score in this regard include those that do not have a surface water outlet and instead are isolated from flowing surface water. This model also does not account for wetland size and as such, larger wetlands do not necessarily score higher than small wetlands, although size may factor into this function.

A majority of wetlands had a high (72%) functional water quality score, and a moderate (53%) water quality benefit score.

Aquatic Support Group

The aquatic support group comprises four individual functions: stream flow support; aquatic invertebrate habitat; organic nutrient export; and water cooling. The main function of this group is to determine the wetland's ability to support ecological stream functions that promote habitat health. Wetlands lying adjacent to or containing flowing water score higher than those that do not (e.g., isolated wetlands). Additionally, headwater wetlands are crucial for supporting stream flow during the dry season by contributing to water flow via groundwater input and storage capacity. Headwater wetlands provide stream flow and cooling functions due to their typically limited exposed surface water, insulating properties and groundwater water storage and retention time. Treed swamps can also provide aquatic support through groundwater discharge (e.g., seeps) and vegetation shading.

All wetlands had either a moderate (33%) or high (67%) score for the aquatic support functional group, and the majority of wetlands had a lower rating (74%) for the aquatic support group benefit score.

Aquatic Habitat Group

The aquatic habitat group is compiled from five different functions: anadromous fish habitat, resident fish habitat, amphibian and turtle habitat, waterbird feeding habitat, and waterbird nesting habitat. Wetlands that have the higher functions within this group include those that are adjacent to or contain water features with potential habitat characteristics (e.g., in-stream cover, aquatic vegetation, etc.).

The majority of wetlands (60%) received low aquatic habitat functional scores, while aquatic habitat group benefit scores were a mix between low (46%), moderate (34%), and high (20%).

Transition Habitat Group

The transition habitat group comprises three different functions: songbird, raptor, and mammal habitat, native plant habitat and pollinator habitat. The main function of the collective group is to evaluate the wetland's ability to support healthy habitat for birds, mammals, and native plants.

The Study Area has a mix of remote habitat and fragmented or disturbed habitat. The majority of wetlands (70%) scored high on transition habitat function, while (54%) scored low on transition habitat group benefit.

Wetland Condition

Wetland condition refers to the integrity or health of a wetland as defined by its vegetative composition and richness of native species. Scores are derived from the similarity between the wetland being evaluated and reference wetlands of the same type and landscape setting (Adamus, 2021).

The wetlands have a range of wetland condition scores with the majority of wetlands receiving moderate (22%) and higher scores (65%). The wetlands with moderate to higher ranks contain a relatively good level of ecological integrity and species diversity. Lower ranked wetlands are typically smaller wetlands associated with historic disturbances such as roads, trails, timber harvesting etc., which may be more susceptible to changes in their surroundings.

Wetland Risk

Wetland risk takes sensitivity and stressors into account by averaging the two. Sensitivity is the lack of intrinsic resistance and resilience of the wetland to human or naturally caused stress (Niemi et al., 1990). Stress relates to the degree to which the wetland is or has recently been anthropogenically altered in a way that degrades natural condition and/or function. The functional assessment tool uses five metrics to measure sensitivity: abiotic resistance, biotic resistance, site fertility, availability of colonizers, and growth rate. The model applies four stress groups: hydrologic stress, water quality stress, fragmentation stress, and general disturbance stress. Wetlands that are highly resilient may have lower risk scores despite their exposure to multiple stressors. Additionally, wetlands exposed to fewer threats, but with low resilience may have higher risk scores. Wetland resilience is tied to multiple factors, such as size, proximity to natural land cover, and presence of invasive species.

Most of the wetlands scored moderate (32%) or high (66%) for wetland risk, meaning they have a reasonable resilience and are not highly susceptible to change. Six wetlands scored lower, indicating a greater risk and susceptibility to anthropological impacts.

Wetlands of Special Significance

None of the field-delineated wetlands met the criteria for WSS, as dictated by the Functional WSS Interpretation Results within the WESP-AC spreadsheet calculator. The results of the wetland field assessments were also cross-referenced with breeding bird, vegetation, and lichen survey results, specifically for SAR (listed as Endangered or Threatened) with habitat requirements tied to wetlands. As a result, three wetlands were determined to be potential WSS based on the confirmed presence of avian SAR (Table 9.14). Official WSS designation will be made by NSECC.

Table 9.14: Summary of Field-Identified Potential WSS, as Determined by the Presence of Avifauna SAR

Wetland ID	Wetland Type(s)	Rationale for Potential WSS Designation
WL21	Treed Swamp; Bog	Canada warbler (<i>Cardellina canadensis</i>) breeding pair observed in wetland.
WL29	Shrub Swamp	Canada warbler and olive-sided flycatcher (<i>Contopus cooperi</i>) heard in wetland during breeding season.
WL92	Bog	Olive-sided flycatcher heard in wetland during breeding season.

9.2.5 Effects Assessment

Project-Wetland Interactions

Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact wetlands through habitat removal, disruptions to hydrology, and/or displacement of sediment (Table 9.15).

Table 9.15: Potential Project-Wetland Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	X
Decommissioning	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries

The LAA for wetlands is the Assessment Area. The RAA is the boundary of secondary watersheds that intersect with the Assessment Area (Drawing 9.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for wetlands. The VC-specific definition for magnitude is as follows:

- Negligible: No direct loss of wetland habitat or alteration to wetland functions expected.
- Low: Direct loss of wetland habitat, but overall wetland functions remain intact.
- Moderate: Direct loss of wetland habitat and impact to wetland functions, but wetland area loss will not impact the hydrology of the watershed. Where WSS are impacted, adequate general SAR habitat is prevalent elsewhere within the RAA.
- High: Direct loss of wetland habitat and impact to wetland functions; and wetland area loss will affect the hydrology of the watershed and the impacted wetland areas are part of a WSS that provides unique SAR habitat within the RAA.

Effects

Effects to wetlands include both habitat loss and changes in wetland functionality and can occur throughout the life of the Project. Effects might be direct (e.g., habitat loss through infilling) or indirect (e.g., changes to functionality due to hydrologic shifts). Effect-specific active management, mitigation, and long-term monitoring are required to eliminate, mitigate, or otherwise manage the magnitude of these direct effects.

Habitat Loss

Habitat loss can occur both directly (i.e., excavation or infilling) and indirectly (i.e., altered hydrology or canopy cover) from the Project (Trombulak & Frissell, 2000). Loss of habitat can fragment wildlife corridors, potentially isolating species and lowering species richness. Habitat loss can also disrupt vital habitat characteristics that support vulnerable species. Further, the removal or infilling of wetland habitat can impact the hydroperiod of neighbouring wet areas, resulting in farther reaching impacts on habitat quality (Mitsch & Gosselink, 2000).

A GIS suitability analysis was conducted to design a Project Footprint that would optimize the placement of Project infrastructure to avoid and minimize loss of wetland area and function, where practicable. A summary of field-delineated and PWL identified within the Assessment Area (Drawing 9.3A to 9.3Q) that are expected to overlap with the Project Footprint is provided in Table 9.16 and 9.17, respectively.

Table 9.16: Habitat Alteration Potential for Field-Delineated Wetlands

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Estimated Area of Potential Impact (m ²)	Activity
WL6	Treed swamp; Shrub swamp	Partial	724	20	Road construction
WL9	Treed swamp	Partial	932	95	Road upgrades
WL10	Treed swamp; Bog	Partial	8,784	737	Road construction
WL11	Treed swamp; Shrub swamp	Full	209	183	Road construction
WL12	Treed swamp	Full	441	441	Road construction
WL13	Shrub swamp; Treed swamp	Full	1,843	1,015	Road upgrades
WL15	Bog	Partial	4,494	26	Turbine pad construction
WL16	Treed swamp	Full	524	34	Turbine pad construction
WL17	Treed swamp	Full	198	198	Turbine pad construction
WL19	Treed swamp	Full	1,761	1,342	Road construction
WL22	Bog; Treed swamp; Shrub swamp	Partial	8,785	3,347	Road construction
WL23	Shrub swamp; Marsh	Partial	1,155	407	Road upgrades
WL24	Treed swamp	Partial	917	53	Road upgrades
WL25	Treed swamp; Shrub swamp	Partial	1,175	250	Road upgrades
WL26	Treed swamp	Partial	2,524	696	Road upgrades
WL27	Bog; Shrub swamp	Partial	2,363	720	Road upgrades
WL28	Treed swamp; Shrub swamp; Fen	Partial	27,926	9,119	Road construction
WL29	Shrub swamp	Partial	1,139	298	Road upgrades
WL30	Fen	Partial	415	82	Road upgrades
WL31	Shrub swamp	Partial	2,317	168	Road upgrades
WL32	Shrub swamp; Bog	Partial	973	35	Road upgrades
WL35	Fen	Partial	811	152	Road upgrades
WL36	Treed swamp	Partial	800	337	Road upgrades
WL39	Shrub swamp; Bog	Partial	1,204	79	Road upgrades
WL40	Bog	Partial	2,188	587	Road upgrades
WL45	Treed swamp	Partial	6,553	2,420	Road construction
WL46	Treed swamp	Partial	1,807	145	Road upgrades
WL47	Treed swamp; Shrub swamp	Partial	4,303	1,725	Road upgrades
WL48	Shrub swamp; Treed swamp	Partial	11,473	5,131	Road construction
WL50	Shrub swamp	Full	242	117	Road upgrades

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Estimated Area of Potential Impact (m ²)	Activity
WL51	Treed swamp; Shrub swamp	Partial	14,799	2,166	Road and turbine pad construction
WL52	Shrub swamp	Full	543	113	Road upgrades
WL53	Shrub swamp; Treed swamp	Partial	3,756	1,632	Road upgrades
WL54	Fen	Partial	1,566	459	Road upgrades
WL55	Treed swamp	Full	246	215	Road upgrades
WL56	Treed swamp	Partial	314	46	Road upgrades
WL57	Bog	Partial	21,158	1,019	Turbine pad construction
WL60	Shrub swamp	Partial	719	207	Road upgrades
WL61	Treed swamp	Partial	3,154	2,211	Road upgrades
WL62	Treed swamp	Partial	2,068	1,406	Road upgrades
WL64	Treed swamp	Partial	882	207	Road upgrades
WL66	Shrub swamp	Full	284	113	Road upgrades
WL67	Treed swamp	Full	207	76	Road upgrades
WL68	Bog	Partial	1,359	670	Road upgrades and construction
WL69	Treed swamp	Partial	2,067	616	Road upgrades and construction
WL70	Treed swamp	Partial	9,401	4,230	Road upgrades
WL71	Treed swamp	Full	721	375	Road upgrades
WL72	Treed swamp	Full	542	272	Road upgrades
WL73	Treed swamp; Bog	Partial	1,526	265	Road upgrades
WL74	Shrub swamp	Partial	6,651	185	Road upgrades and turbine pad construction
WL75	Treed swamp	Full	3,224	977	Road upgrades
WL76	Treed swamp	Partial	825	506	Road upgrades
WL78	Fen; Shrub swamp	Partial	1,983	494	Road upgrades
WL82	Bog; Treed swamp	Partial	6,921	2,458	Road upgrades
WL83	Treed swamp; Bog	Partial	2,689	1,157	Road upgrades
WL85	Treed swamp; Shrub swamp	Partial	1,723	610	Road upgrades
WL86	Shrub swamp	Partial	720	374	Road upgrades
WL87	Bog; Marsh	Full	551	336	Road upgrades
WL90	Treed swamp	Partial	1,192	469	Road upgrades
WL91	Bog	Partial	1,863	550	Road upgrades
WL92	Bog	Partial	1,990	491	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Estimated Area of Potential Impact (m ²)	Activity
WL93	Bog	Partial	1,582	557	Road upgrades
WL94	Treed swamp	Partial	716	62	Road upgrades
WL96	Treed swamp	Partial	3,859	1,888	Road construction
WL101	Bog	Partial	1,500	62	Road upgrades
WL102	Bog	Full	375	172	Road upgrades
WL104	Treed swamp	Partial	2,609	935	Road upgrades
WL106	Shrub swamp; Treed swamp	Full	441	242	Road construction
WL108	Treed swamp; Shrub swamp	Partial	8,283	4,328	Road upgrades
WL109	Bog; Treed swamp	Partial	1,023	327	Road upgrades
WL110	Treed swamp	Partial	4,001	1,758	Road upgrades
WL113	Shrub swamp	Partial	2,565	1,422	Road construction
WL114	Fen	Partial	2,576	1,144	Road upgrades
WL115	Treed swamp; Shrub swamp	Partial	1,323	210	Road upgrades
WL117	Treed swamp	Full	1,487	9	Turbine pad construction
WL120	Treed swamp; Shrub swamp	Partial	1,414	740	Road construction
WL122	Bog	Partial	989	243	Road upgrades
WL123	Treed swamp	Partial	7,135	3,044	Road construction
WL125	Treed swamp	Full	1,841	1,378	Road construction
WL126	Treed swamp	Partial	3,727	1,385	Road construction
WL127	Bog; Shrub swamp	Partial	1,029	48	Road construction
WL128	Treed swamp	Partial	208	6	Road upgrades
WL129	Bog; Shrub swamp	Partial	3,115	1,398	Road upgrades
WL131	Shrub swamp	Partial	2,299	186	Road upgrades
WL132	Treed swamp	Partial	361	15	Road upgrades
WL133	Treed swamp	Partial	2,663	530	Road upgrades
WL134	Bog	Partial	586	133	Road upgrades
WL138	Bog	Partial	2,766	1,230	Road upgrades
WL139	Bog	Partial	28,487	6,354	Road construction
WL140	Shrub swamp; Bog	Partial	1,371	500	Road upgrades
WL141	Shrub swamp; Treed swamp	Partial	1,954	912	Road construction
WL142	Shrub swamp	Partial	12,229	5,069	Road construction
WL143	Fen	Partial	1,384	1,029	Road upgrades
WL144	Treed swamp	Partial	4,191	2,127	Road upgrades and construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Estimated Area of Potential Impact (m ²)	Activity
WL145	Fen; Marsh	Partial	937	628	Road upgrades
WL147	Bog	Partial	8,880	5,010	Road construction
WL148	Bog; Treed swamp	Partial	6,765	3,161	Road construction
WL150	Treed swamp; Shrub swamp	Partial	94,909	6,095	Road upgrades and construction
WL151	Treed swamp; Bog	Partial	12,317	5,865	Road construction
WL153	Shrub swamp	Partial	1,677	480	Road upgrades
WL154	Treed swamp; Bog	Partial	1,300	389	Road construction
WL155	Treed swamp; Shrub swamp	Partial	1,893	851	Road upgrades
WL156	Treed swamp	Full	1,295	459	Road upgrades
WL157	Shrub swamp	Partial	3,107	624	Road upgrades
WL158	Bog	Partial	1,815	684	Road construction
WL159	Treed swamp	Full	2,392	1,696	Road construction
WL161	Treed swamp	Partial	365	77	Road upgrades
WL162	Fen	Partial	2,544	804	Road construction
WL164	Bog	Partial	799	7	Road upgrades
WL165	Treed swamp; Shrub swamp; Bog	Partial	39,995	7,022	Road upgrades, road and turbine pad construction
WL167	Shrub swamp	Partial	1,751	511	Road upgrades
WL169	Treed swamp	Full	179	179	Road construction
WL170	Treed swamp; Shrub swamp	Partial	10,717	4,668	Road construction
WL171	Treed swamp	Partial	9,151	4,112	Road construction
WL172	Treed swamp	Partial	643	147	Road upgrades
WL174	Shrub swamp; Treed swamp	Full	1,017	599	Road construction
WL175	Shrub swamp	Full	619	538	Road construction
WL176	Treed swamp; Shrub swamp	Partial	1,078	10	Road upgrades
WL177	Shrub swamp	Partial	3,938	1,507	Road upgrades
WL178	Shrub swamp	Partial	2,459	698	Road construction
WL180	Bog	Partial	594	104	Road upgrades
WL181	Bog; Treed swamp	Full	966	651	Road upgrades
WL182	Shrub swamp; Treed swamp	Partial	1,473	78	Road upgrades
WL184	Shrub swamp	Partial	2,026	911	Road construction
WL187	Shrub swamp	Partial	11,787	4,032	Road upgrades
WL189	Shrub swamp	Partial	367	25	Road upgrades

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Estimated Area of Potential Impact (m ²)	Activity
WL190	Shrub swamp	Partial	950	116	Road upgrades
WL191	Bog	Partial	1,578	947	Road construction
WL192	Bog	Partial	3,009	37	Road upgrades
WL193	Bog	Partial	3,013	1,544	Road construction
WL194	Treed swamp	Partial	13,884	5,298	Road construction
WL195	Treed swamp	Partial	8,826	2,492	Road upgrades and construction
WL196	Shrub swamp; Treed swamp	Partial	3,899	2,086	Road upgrades
WL197	Treed swamp	Partial	3,011	1,125	Road construction
WL199	Treed swamp	Partial	308	7	Road upgrades
WL200	Treed swamp; Bog	Partial	36,482	7,056	Road and turbine pad construction
WL202	Shrub swamp	Partial	12,777	4,435	Road construction
WL203	Treed swamp; Bog	Partial	2,206	922	Road construction
WL204	Bog	Partial	1,173	459	Road upgrades
WL205	Treed swamp; Shrub swamp	Partial	12,465	1,401	Road construction
WL212	Bog; Shrub swamp	Partial	9,104	310	Turbine pad construction
WL215	Shrub swamp; Bog	Full	1,577	1,098	Road construction
WL217	Bog	Partial	1,393	405	Road upgrades and construction
WL218	Bog	Partial	964	357	Road upgrades
WL219	Treed swamp; Shrub swamp; Bog	Partial	4,653	2,371	Road construction
WL220	Treed swamp	Partial	5,865	3,080	Road construction
WL221	Bog	Partial	978	289	Road construction
WL222	Treed swamp	Partial	6,351	777	Road construction
WL224	Treed swamp	Partial	1,202	470	Road upgrades
WL226	Shrub swamp	Partial	9,844	5,299	Road construction
WL228	Treed swamp	Partial	5,332	1,748	Road upgrades
WL230	Shrub swamp	Partial	768	264	Road construction
WL231	Treed swamp; Shrub swamp; Bog	Full	842	321	Road construction
WL232	Shrub swamp	Full	366	355	Road construction
WL233	Shrub swamp	Full	154	154	Road construction
WL234	Treed swamp	Partial	1,160	129	Road construction
WL236	Shrub swamp; Treed swamp	Partial	319	156	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Estimated Area of Potential Impact (m ²)	Activity
WL237	Treed swamp	Partial	1,691	492	Road upgrades
WL240	Bog; Shrub swamp	Full	1,677	1,585	Road construction
WL241	Treed swamp	Full	372	171	Road construction
WL242	Treed swamp; Shrub swamp	Full	912	856	Road construction
WL243	Treed swamp	Partial	565	148	Road construction
WL245	Treed swamp	Partial	4,070	2,567	Road construction
WL247	Shrub swamp; Treed swamp	Full	1,231	1,039	Road construction
WL248	Treed swamp	Full	1,300	1,023	Road construction
WL251	Treed swamp	Partial	1,743	391	Road upgrades
WL253	Shrub swamp	Full	549	332	Road construction
WL254	Shrub swamp; Bog	Partial	1,828	1,145	Road construction
WL255	Bog	Full	868	432	Road construction
WL256	Shrub swamp	Partial	302	16	Road construction
WL257	Treed swamp	Full	511	427	Road construction
WL258	Treed swamp; Shrub swamp	Partial	1,796	635	Road construction
WL259	Shrub swamp; Bog	Partial	1,923	479	Road construction
WL260	Treed swamp	Partial	2,502	972	Road upgrades
WL261	Shrub swamp	Partial	1,554	623	Road upgrades
WL262	Treed swamp; Bog	Full	1,556	1,210	Road construction
WL263	Treed swamp	Partial	946	248	Road construction
WL264	Bog; Shrub swamp	Partial	387	95	Road construction
WL265	Treed swamp	Partial	1,060	210	Road upgrades
WL266	Treed swamp; Bog; Shrub swamp	Partial	13,660	2,314	Road construction
WL268	Treed swamp; Shrub swamp	Full	818	724	Road construction
WL269	Bog	Partial	1,335	443	Road upgrades
WL270	Treed swamp	Partial	935	334	Road upgrades
WL271	Bog	Partial	986	74	Road upgrades
WL273	Bog; Shrub swamp	Partial	1,788	403	Road construction
WL274	Bog	Full	1,005	479	Road construction
WL276	Treed swamp	Partial	623	43	Road upgrades and construction
WL280	Bog	Full	1,878	1,271	Road construction
WL281	Treed swamp	Partial	1,722	440	Road upgrades and construction
WL282	Bog	Partial	1,338	738	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Estimated Area of Potential Impact (m ²)	Activity
WL283	Treed swamp	Partial	5,345	2,024	Road construction
WL284	Bog	Partial	958	338	Road upgrades
WL286	Treed swamp	Partial	701	100	Road upgrades
WL288	Bog	Partial	627	305	Road upgrades
WL291	Treed swamp	Partial	1,101	12	Road upgrades
WL292	Treed swamp	Partial	14,076	923	Road and turbine pad construction
WL293	Treed swamp	Full	737	660	Road construction
WL294	Shrub swamp; Marsh	Full	3,438	2,667	Road construction
WL295	Bog	Partial	6,509	19	Turbine pad construction
WL298	Treed swamp	Partial	1,700	604	Road upgrades
WL301	Treed swamp	Partial	3,485	1,003	Road construction
WL302	Treed swamp	Partial	5,697	3,909	Road upgrades and construction
WL303	Shrub swamp	Partial	5,593	2,539	Road construction
WL304	Bog	Partial	1,775	215	Road construction
WL305	Shrub swamp	Full	1,555	760	Road construction
WL306	Shrub swamp	Partial	1,926	1,209	Road construction
WL307	Bog	Partial	3,130	263	Road upgrades
WL308	Treed swamp	Partial	6,607	2,133	Road construction
WL309	Treed swamp; Bog	Partial	9,478	4,661	Road construction
WL310	Bog	Partial	1,502	524	Road upgrades
WL311	Shrub swamp	Partial	1,461	717	Road upgrades
WL313	Shrub swamp	Partial	2,912	989	Road upgrades
WL314	Bog	Partial	435	119	Road upgrades
WL321	Shrub swamp; Marsh	Partial	2,410	623	Road upgrades
WL322	Fen	Partial	5,425	2,350	Road upgrades
WL323	Treed swamp; Shrub swamp	Partial	53,504	24,151	Road construction
WL324	Treed swamp	Partial	1,326	529	Road upgrades
WL325	Bog	Full	571	218	Road upgrades
WL326	Bog	Full	1,765	1,045	Road construction
WL327	Treed swamp	Partial	1,067	647	Road construction
WL328	Bog	Partial	7,231	1,435	Turbine pad construction
WL329	Treed swamp; Bog	Partial	6,837	1,750	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Estimated Area of Potential Impact (m ²)	Activity
WL330	Bog	Full	1,245	247	Turbine pad construction
WL331	Fen	Partial	21,637	9	Road construction
WL332	Fen	Full	363	177	Road upgrades
WL334	Shrub swamp	Partial	9,021	3,901	Road construction
WL335	Fen; Marsh	Partial	10,287	3,418	Road upgrades
WL336	Bog	Partial	2,226	168	Road upgrades
WL337	Bog	Full	581	221	Road construction
WL338	Bog	Partial	2,387	340	Road upgrades
WL339	Treed swamp	Partial	1,157	80	Road upgrades
WL340	Bog	Partial	1,630	550	Road upgrades and construction
WL341	Bog	Partial	1,510	462	Road upgrades
WL342	Treed swamp	Partial	5,345	2,463	Road construction
WL343	Treed swamp; Bog	Full	2,836	653	Road and turbine pad construction
WL344	Shrub swamp	Partial	1,911	701	Road upgrades
WL345	Shrub swamp	Partial	1,798	700	Road construction
WL346	Bog; Treed swamp	Partial	34,677	73	Turbine pad construction
WL347	Treed swamp	Partial	2,562	1,043	Road construction
WL348	Treed swamp	Partial	4,659	2,425	Road construction
Total Estimated Area with Potential Impact				291,868 m²	

Table 9.17: Habitat Alteration Potential for Predicted Wetlands within the Assessment Area

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Area of Potential Impact (m ²)	Activity
PWL1	Shrub swamp	Full	1,508	1,462	Road construction
PWL2	Treed swamp; Shrub swamp	Partial	3,930	2,088	Road construction
PWL3	Treed swamp	Partial	2,664	1,482	Road construction
PWL4	Treed swamp	Partial	5,105	2,435	Road construction
PWL6	Treed swamp; Shrub swamp	Partial	16,134	7,184	Road construction
PWL7	Treed swamp	Partial	1,187	449	Road construction
PWL8	Treed swamp	Partial	2,443	1,232	Road construction
PWL9	Treed swamp	Partial	1,297	24	Road construction
PWL11	Treed swamp	Partial	749	312	Road construction
PWL12	Treed swamp	Partial	372	20	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Area of Potential Impact (m ²)	Activity
PWL13	Treed swamp	Full	100	100	Turbine pad construction
PWL15	Shrub swamp; Treed swamp	Partial	19,466	8,302	Road construction
PWL18	Fen	Partial	3,198	1,333	Road construction
PWL20	Treed swamp	Partial	4,443	1,530	Road construction
PWL22	Treed swamp; Shrub swamp	Partial	36,257	4,111	Road and turbine pad construction
PWL27	Treed swamp	Partial	10,530	603	Turbine pad construction
PWL28	Shrub swamp; Treed swamp	Full	1,555	888	Road construction
PWL29	Treed swamp; Bog	Full	5,873	1,630	Road construction
PWL35	Treed swamp	Full	876	819	Road construction
PWL36	Treed swamp	Partial	925	245	Road construction
PWL38	Treed swamp	Partial	1,333	725	Road construction
PWL41	Bog	Partial	6,587	3,954	Turbine pad construction
PWL43	Bog; Treed swamp	Partial	4,331	102	Road construction
PWL44	Bog	Partial	9,697	5,953	Road construction
PWL46	Treed swamp	Full	4,091	3,215	Turbine pad construction
PWL47	Bog	Partial	2,031	79	Road construction
PWL49	Treed swamp	Partial	9,191	4,836	Road construction
PWL51	Treed swamp	Full	1,209	938	Road construction
PWL52	Bog	Full	1,074	1,027	Road construction
PWL53	Shrub swamp; Treed swamp	Full	1,765	799	Road construction
PWL56	Bog	Partial	4,427	1,952	Road construction
PWL57	Bog	Full	515	189	Road construction
PWL58	Bog	Partial	742	315	Road construction
PWL60	Bog	Partial	285	32	Road construction
PWL61	Shrub swamp; Treed swamp	Full	951	944	Road construction
PWL62	Bog; Shrub swamp	Partial	1,243	136	Road construction
PWL66	Fen	Partial	4,200	1,827	Road construction
PWL67	Fen	Partial	1,528	598	Road construction
PWL68	Treed swamp	Partial	4,811	1,009	Road construction
PWL71	Treed swamp	Partial	685	263	Road construction
PWL72	Treed swamp	Partial	2,428	1,243	Road construction
PWL73	Treed swamp; Shrub swamp	Partial	2,236	934	Road construction
PWL74	Treed swamp	Full	189	99	Road construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Area of Potential Impact (m ²)	Activity
PWL75	Shrub swamp	Full	404	44	Road construction
PWL76	Shrub swamp; Treed swamp	Partial	2,768	1,847	Road construction
PWL77	Treed swamp; Shrub swamp	Partial	8,840	3,286	Road construction
PWL78	Treed swamp	Full	324	99	Road construction
PWL79	Treed swamp	Partial	1,294	869	Road construction
PWL81	Treed swamp; Shrub swamp; Bog	Partial	8,548	256	Turbine pad construction
PWL82	Treed swamp; Shrub swamp	Partial	1,958	771	Road construction
PWL83	Bog; Shrub swamp	Partial	1,905	749	Road construction
PWL85	Bog; Treed swamp	Partial	9,293	5,286	Road construction
PWL86	Bog; Treed swamp	Partial	3,490	431	Road construction
PWL87	Shrub swamp	Partial	631	170	Road construction
PWL89	Treed swamp; Shrub swamp	Partial	5,643	171	Turbine pad construction
PWL91	Treed swamp	Full	1,607	789	Road construction
PWL92	Treed swamp; Shrub swamp; Bog	Partial	11,172	726	Road construction
PWL93	Treed swamp; Shrub swamp	Full	1,920	1,340	Road construction
PWL94	Treed swamp; Shrub swamp	Partial	7,752	4,190	Road construction
PWL95	Bog	Partial	1,668	611	Road construction
PWL96	Bog	Partial	3,369	1,297	Road construction
PWL97	Treed swamp; Shrub swamp	Partial	6,592	1,856	Road construction
PWL98	Fen; Shrub swamp; Treed swamp	Partial	5,651	1,015	Turbine pad construction
PWL100	Treed swamp; Shrub swamp	Partial	4,128	1,982	Road construction
PWL101	Treed swamp	Partial	3,870	1,559	Road construction
PWL102	Bog; Treed swamp	Partial	11,165	5,564	Road construction
PWL103	Bog; Treed swamp	Partial	27,100	13,971	Road construction
PWL104	Treed swamp; Shrub swamp	Partial	3,396	1,681	Road construction
PWL105	Shrub swamp; Bog	Partial	12,929	5,908	Road construction
PWL106	Fen; Shrub swamp; Treed swamp	Partial	10,816	5,191	Road construction
PWL107	Shrub swamp	Full	1,323	1,029	Road construction
PWL108	Treed swamp	Full	334	98	Road construction
PWL110	Bog	Full	3,483	1,942	Road construction
PWL118	Treed swamp; Shrub swamp	Partial	5,155	2,301	Road construction
PWL119	Shrub swamp; Treed swamp	Full	4,467	25	Turbine pad construction

Wetland ID	Wetland Type	Delineation Extent	Delineated Area (m ²)	Area of Potential Impact (m ²)	Activity
PWL120	Treed swamp; Shrub swamp	Partial	6,814	3,013	Road construction
PWL121	Fen; Shrub swamp, Treed swamp	Partial	33,319	4,022	Road and turbine pad construction
PWL122	Treed swamp; Shrub swamp	Partial	5,025	2,777	Road construction
PWL123	Treed swamp	Full	5,929	421	Road construction
PWL126	Treed swamp	Partial	1,338	524	Road construction
PWL128	Treed swamp	Full	8,587	3,337	Turbine pad construction
PWL131	Treed swamp	Full	1,606	894	Road construction
PWL132	Treed swamp; Shrub swamp; Bog	Partial	21,335	4,733	Road and turbine pad construction
PWL133	Treed swamp	Partial	2,551	757	Road construction
PWL134	Treed swamp; Shrub swamp; Bog	Partial	2,459	1,188	Road construction
PWL135	Shrub swamp	Full	600	577	Road construction
PWL136	Shrub swamp	Partial	6,113	2,268	Road construction
PWL137	Shrub swamp	Partial	1,197	558	Road construction
PWL138	Bog	Full	328	327	Road construction
PWL140	Treed swamp	Partial	3,978	1,851	Road and turbine pad construction
PWL141	Treed swamp; Bog	Partial	6,552	2,876	Road construction
PWL142	Bog	Partial	1,063	327	Road construction
PWL143	Treed swamp; Fen	Partial	10,324	269	Turbine pad construction
PWL144	Treed swamp; Bog	Partial	3,829	1,776	Road construction
PWL146	Bog	Partial	1,430	376	Road construction
PWL147	Bog	Partial	28,963	3,168	Turbine pad construction
PWL148	Treed swamp; Bog	Partial	2,457	1,164	Road construction
PWL149	Bog	Partial	1,418	136	Road construction
PWL150	Bog	Partial	1,112	553	Road construction
Total Estimated Area with Potential Impact				172,365 m²	

The results of the field assessments indicate that there is potential for 240 field-delineated Project-wetland interactions and 99 PWL Project-wetland interactions comprising partial (333) or complete (six) infills to facilitate Project development. The Proponent prioritized the use of existing disturbed areas, with approximately 129 km of new road being constructed and approximately 94 km of previously existing road being utilized. As such, 116 of the potential alterations would be associated with upgrades to existing roads only (if determined to be required during the detailed design phase) and 182 of the potential alterations are associated

with the construction of new roads. An additional 10 potential alterations are associated with both upgrades to existing roads and construction of new roads. While many wetlands within the Assessment Area around turbines are expected to be completely avoided through the detailed design of turbines, there are currently 21 potential alterations stemming from turbine pad construction only. The remaining 10 potential alterations are associated with a combination of road construction and/or upgrades and turbine construction.

Approval from NSECC is, for previous wind energy projects, typically required to work within 30 m of a wetland, and alteration approval is needed for alterations. In areas where wetland alteration is unavoidable, the detailed design phase, where practicable, will refine the layout so that wetland crossings will occur along wetland edges or narrow portions of the wetland and will configure infrastructure in a way to impact as little of the wetland as practicable. Furthermore, any necessary wetland crossings will be designed to avoid any permanent diversion, restriction or blockage of natural flow, such that the hydrologic function of the wetland is maintained. Specific details of the crossings will be finalized during the detailed design phase and will be included in the application for wetland alteration.

Provincial wetland data obtained from the Canadian Wetland Inventory (CNWI) (ECCC, 2024a) was used to estimate the total amount of wetland habitat within the 45,086 ha RAA. An estimated 6,407 ha of wetland habitat was identified, which equates to approximately 14.2% of the RAA. Field delineated and predicted wetland data were used to estimate the total amount of wetland habitat within the assessed portion of the LAA (i.e., excluding areas identified in Drawing 4.1). An estimated 185 ha of wetland habitat was identified, which equates to approximately 8.1% of the assessed portion of the LAA. Field-delineated and predicted wetland habitat that may be directly impacted by the Project comprises approximately 46 ha, or 0.1% of the total area within the RAA, which is approximately 0.7% of the potential wetland habitat within the RAA and approximately 24.9% of the delineated and predicted wetland habitat within the assessed portion of the LAA. Mitigations for loss of wetlands will ensure that the provincial wetland policy of no net loss of wetland habitat and function will be upheld.

Three wetlands were identified as potential WSS due to the presence of avian SAR. No alterations are expected to be required in WL21 where a breeding pair of Canada warbler was observed. The remaining two potential WSS (WL29 and WL92) may, however, require alteration; WL29 is adjacent to an existing road that may require upgrades, and WL92 lies along a new proposed road corridor. Olive-sided flycatcher was observed in both wetlands and Canada warbler was observed in WL29 only; both species were observed in suitable breeding habitat during their respective breeding seasons.

Suitable habitat for both olive-sided flycatcher and Canada warbler is abundant through the Study Area, as determined through avian SAR habitat modelling (Section 10.4.5). Based on the habitat modelling, there is 15,343 ha of modelled suitable habitat for Canada warbler and 6,885 ha of modelled suitable habitat for olive-sided flycatcher within a 5 km buffer of the Study Area. The model identified areas of potentially suitable habitat for olive-sided flycatcher associated with wetland complexes both south and northeast of the Assessment Area.

Additionally, the potential WSS in which both olive-sided flycatcher and Canada warbler were observed is a small component of a larger wetland complex that continues outside the Assessment Area. The majority of this wetland complex will not require alteration and is expected to provide suitable habitat for both olive-sided flycatcher and Canada warbler, as seen in these species habitat modelling results. Habitat modelling suggests that habitat used by Canada warbler and olive-sided flycatcher is not unique within the Assessment Area and the surrounding region. Furthermore, any individual SAR displaced by wetland habitat loss associated with the Project are anticipated to move to suitable habitat nearby. Potential impacts to avian SAR and their habitat are discussed further in Section 10.4.

Where practical, potential WSS will be avoided through the detailed design process. If the detailed design process requires unavoidable impacts to WSS, the proposed impacts will be minimized and consider, where practical, avoiding portions of the wetlands that provided suitable habitat for the respective SAR bird species.

Indirect Loss

Indirect losses to wetlands generally occur as a result of construction but the effects become noticeable during the operation of the Project. Indirect loss of wetland habitat occurs through disruption of the hydrology of a wetland through the redirection of surface and subsurface water to a wetland. The hydrology of a wetland is one of the most important aspects of its overall structure and function. Project infrastructure located within or near a wetland can result in changes in the quantity and timing of water flow, potentially affecting species composition, water treatment capacity, and nutrient export (Mitsch & Gosselink, 2000). Additionally, disruptions to hydrology in one area may reduce the hydrological connectivity to other areas, causing impacts that may extend into neighbouring wetlands.

Indirect loss may be mitigated through surface water management to ensure that pre-existing hydrologic sources are continuing to feed into a wetland. As hydrologic impacts are not immediately identified, long-term monitoring is required to evaluate wetland changes post-alteration and are included within the wetland alteration approval process. Often shifts in hydrology on a project site do not result in direct loss, but rather a change in the wetland type and function. Surface water management for the Project will consider the location of wetlands not directly impacted by the Project, and hydrology will be maintained in partially altered wetlands.

Changes to Wetland Functionality

Changes to wetland functionality may be caused through habitat loss, as discussed above, or through other Project activities that may release dust, sediment or invasive species into the wetland, thus shifting its ecological, chemical, and hydrological profiles.

Erosion and Sedimentation

Erosion and sedimentation can occur throughout the lifecycle of the Project, including during construction efforts, daily traffic, routine road and transmission line right of way (ROW) maintenance. The accumulation of sediment within wetland environments can cause shifts in

ecological integrity, including the plant species composition and subsequent nutrient retention potential, hydrological storage capabilities, and habitat suitability for vulnerable species (Tilman et al., 1997). Additionally, the use of road salt for winter maintenance may result in indirect adverse effects on microbial and vegetative wetland communities, including detrimental salinity levels and increased soil erosion due to salt-damaged vegetation (Jones et al., 2017).

Dust

The potential for dust deposition will likely be highest during the construction phase, though the risk will be present throughout the Project's lifecycle. Dust primarily impacts vegetative health, with particle size influencing the scale of the impact (Farmer, 1993). Smaller particulate can result in clogged pores, hindering vital biochemical processes including photosynthesis, respiration, and transpiration; and larger particulate can result in lacerations in plant tissues, thus jeopardizing the health of the plant (Farmer, 1993).

Invasive Species

The colonization of invasive species can result in detrimental impacts on wetland environments, including alterations to evapotranspiration rates, infilling from reduced decomposition rates, and ultimately a reduction in the complexity of the wetland and its subsequent species richness (Zedler & Kercher, 2004). The creation of roadways can act as a vector for invasive species, with the potential for seed dispersal increasing with both vehicular and animal traffic. Further, because many invasive species thrive in disturbed soils, routine maintenance of roadways can provide ideal conditions for their establishment (Trombulak & Frissell, 2000).

Compaction

Compaction can hinder both the vegetative and hydrological structure of a wetland, with a loss of pore space restricting root growth and groundwater infiltration (Duiker, 2004). This impacts the absorption of moisture and nutrients, thus impacting the ecological integrity of the wetland and the ecosystem services it provides. Further, compaction can decrease percolation rates, resulting in prolonged periods of saturation, and increasing the potential for flooding (Duiker, 2004).

The temporal and spatial extent of indirect effects such as erosion and sedimentation, dust, invasive species, and compaction can be far reaching, but are often foreseeable, and research based, standardized BMPs can be implemented to mitigate the resulting outcomes. Changes to wetland functionality can be assessed through long-term wetland monitoring to identify biological, hydrologic, and physical shifts within a wetland.

Mitigation Measures

The following specific mitigative measures will be implemented to avoid and mitigate any potential effects on wetlands.

Habitat Loss

- Mark wetlands clearly to avoid interference with wetland habitat to the extent practicable.
- Complete wetland delineation and functional assessments in any areas not previously assessed that require permitting.
- Avoid and minimize impacts to wetlands to the extent practicable.
 - Where wetland impacts are unavoidable, wetland alterations will be completed in accordance with the NSECC Wetland Conservation Policy (2019b). The wetland alteration process will occur during the permitting stage, which includes a requirement to compensate for lost wetland habitat and functions.
 - Adhere to the terms and conditions of the wetland alteration approval.
 - For wetlands along collector lines, orient placement of structures in dry areas adjacent to wetlands thus allowing cables to span wetlands, to the extent practicable.
 - If temporary access roads are required within wetlands, appropriate mitigations, including the use of swamp mats, will be implemented to prevent disturbance.
 - Design wetland crossings to occur at the narrow portion of the wetland or the wetland's edges, to the extent practicable.
 - Swamp mats will be used to limit impacts outside of the alteration area.

Indirect Habitat Loss

- Design wetland crossings to avoid permanent diversion, restriction or blockage of natural flow, such that hydrologic function of wetlands will be maintained.

Erosion and Sedimentation

- Develop a site-specific Erosion and Sediment Control Plan during the detailed design phase.
 - The plan will address the type of control structures, proper installation techniques, grading, maintenance and inspection, timing of installation, and revegetation.
- Limit the area of exposed soil and the length of time soil is exposed without mitigation (e.g., mulching, seeding, rock cover).
- Use the existing roads and access routes to the extent feasible.
- Minimize travel through wetlands.
 - If travel through wetlands is required, use swamp mats and if practicable, time work to occur during frozen ground conditions and/or travel through the drier portions of the wetland, where practicable.
- Direct run-off from construction activities away from wetlands.
- Maintain existing vegetation cover, where practicable.

Dust Deposition

- Use water or an approved dust suppressant to control dust on roads as required.
- Establish site speed limits to minimize dust generation.

Invasive Species

- Clean and inspect work vehicles prior to use to prevent the introduction of invasive/non-native species.

Compaction

- Require that wetland delineation tape is in place and visible to avoid unnecessary compaction within wetlands.
- Hold pre-construction site meetings to educate staff on the sensitivity of wetlands.
- Minimize travel through wetlands.
 - If travel through wetlands is required, use geotextile matting and time work to occur during frozen ground conditions, or travel through the drier portions of the wetland, to the extent practicable.

Monitoring

A site-specific post-construction wetland monitoring plan will be developed to facilitate adaptive management and contribute to the safeguarding of ecological integrity and environmental stability. The plan will be provided to NSECC as part of the permitting process and will likely consist of detailed monitoring and general spot checks. Detailed monitoring typically includes vegetative, hydrological, and soil assessments within the wetland habitat adjacent to the infill site. Spot checks typically involve a general overview of vegetative, hydrological, and soil conditions, focusing on evidence of significant hydrologic alterations and sedimentation.

Conclusion

The predicted residual effects of the Project on wetlands (after mitigation) are characterized in Table 9.18.

Table 9.18: Wetland Resources Residual Effects

	Habitat Loss	Changes in Wetland Function
Magnitude of Effect	Moderate: Direct loss of habitat, including that of potential WSS, but wetland area loss will not impact the hydrology of the watershed. Where WSS are impacted, adequate general SAR habitat is prevalent elsewhere within the RAA.	Low: Project activities have low potential for changes to wetland function with the implementation of mitigation measures.
Geographic Extent of Effect	Assessment Area	Assessment Area
Frequency of Effect	Single Event: Effects will occur once, during initial ground disturbance or vegetation clearing for the Project.	Single Event: Direct effects resulting from construction activities will occur once, and indirect effects to wetland function will be mitigated through the use of controls.
Duration of Effect	Medium Term: Residual effects will extend until wetlands are restored during decommissioning and/or compensated for following construction.	Medium Term: Residual effects may extend through the operation and maintenance phase of the Project.

	Habitat Loss	Changes in Wetland Function
Reversibility of Effect	Partially Reversible	Partially Reversible
Significance Level	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions)		
Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible		

10.0 TERRESTRIAL ENVIRONMENT

10.1 Terrestrial Vegetation Communities and Flora

10.1.1 Overview

The vegetation community and flora assessment was completed using a combination of desktop and field studies to achieve the following objectives:

- Develop a preliminary understanding of the landscape features, vegetation communities, and flora species within and near the Study Area using desktop resources.
- Undertake field surveys to document the range of vegetation communities and flora present within the Assessment Area, with a focus on sensitive and/or uncommon communities and flora SAR and SOCI (and their supporting habitat).
- Use the information collected during field studies to iteratively update the Project design to avoid or minimize interactions between vegetation communities, flora SAR and SOCI, and Project components.
- Apply mitigation techniques including construction, and operational management practices to minimize the Project's effects on vegetation communities and flora SAR and SOCI (including supporting habitat).

10.1.2 Regulatory Context

Several laws and regulations provide protection for vegetation communities and rare flora in Nova Scotia.

- *Species At Risk Act* (Canada, 2002)
- *Endangered Species Act* (Nova Scotia, 1998)
- *Biodiversity Act* (Nova Scotia, 2021)
- *Environment Act* (Nova Scotia, 1995b)

Species that are listed as Endangered or Threatened receive individual protection from harm and destruction under SARA and/or ESA, including protection of habitually occupied spaces.

For certain rare and sensitive lichen species, special management practices (SMPs) have been established to limit disturbance to individuals and their supporting habitat on Crown land, as outlined in the At-Risk Lichens—Special Management Practices (NSNR, 2018a). For example, limitations to the type and extent of land development are prescribed within protected and/or restricted zones around the occurrence of certain rare lichens. Additional regulations aim to protect important landscape features such as wetlands (described in Section 9.2) that support many plant and lichen SAR and SOCI in Nova Scotia.

The Silvicultural Guide for the Ecological Matrix (McGrath et al., 2021) and An Old-Growth Forest Policy for Nova Scotia (NSNR, 2022a) make recommendations on and regulate forestry and forest management practices on provincial Crown land and offer BMPs for forests on private land. The publications provide direction for maintaining forest ecological integrity and identifying and preserving old-growth forests. Old-growth forest stands are defined in Nova Scotia as “area(s) where 20% or more of the basal area is in trees greater than or equal to the reference age for that forest (ecosystem classification vegetation) type” (NSNR, 2022a). The Old-Growth Forest Policy requires no net loss of old-growth forests on Crown land and stipulates development limitations within 100 m of confirmed old-growth stands.

Finally, the *Environment Act* (Nova Scotia, 1995b) supports and promotes the protection, enhancement, and use of the provincial environment while maintaining ecosystem integrity and sustainable development. The *Biodiversity Act* (Nova Scotia, 2021) provides for the stewardship, conservation, sustainable use, and governance of biodiversity of Nova Scotia.

10.1.3 Desktop Review

Several databases were referenced as part of the desktop review to provide an initial understanding of the landscape characteristics, vegetation communities, and flora species present within and near the Assessment Area. The following references were included in the desktop review:

- Ecological Land Classification for Nova Scotia (Neily et al., 2017)
- Provincial Landscape Viewer (NSNR, 2024c)
- Nova Scotia Forest Inventory (NSNR, 2021f)
- WAM Database (NSECC, 2022c)
- Nova Scotia Wetland Inventory (NSNR, 2021k)
- Nova Scotia Topographic Features Database (GeoNOVA, 2024c)
- Canopy Height Model (GeoNOVA, 2024a)
- Provincial Crown Land Harvest Plan Archive (NSNR, 2025a)
- Old-Growth Policy Layer (NSNR, 2026)
- Old-Growth Potential Index (NSNR, 2023)
- ACCDC Data Report (ACCDC, 2026a)
- Boreal Felt Lichen Habitat Layer (NSNR, 2012a)
- MTRI Vole Ears (*Erioderma mollissimum*) and Extant Boreal Felt Lichen (*Erioderma pedicellatum*) GIS Databases (MTRI, 2019a, 2019b)
- SARA Critical Habitat Layers (ECCC, 2025c)
- SARA and ESA Recovery Strategies

During the desktop review, emphasis was placed on information recorded within 5 km of the Study Area, as this distance captures observational records and mapped habitat that are of high relevance to the Project.

Landscape Characteristics

The Study Area falls within Nova Scotia's Eastern and Atlantic Coastal Ecoregions (Drawing 7.1). The Eastern Ecoregion, which includes the northwestern two thirds of the Study Area, covers 12% of the province and is characterized by rolling plains of glacial till, granite uplands, large chains of lakes, and streams susceptible to acidification (Neily et al., 2017). Acadian softwood forests in the ecoregion are influenced by stand-level disturbances such as hurricanes and fires. The Atlantic Coastal Ecoregion, which includes the remainder of the Study Area, is a thin stretch of land along the eastern coast of Nova Scotia that covers 9% of the province. It is highly influenced by its proximity to the cold Atlantic Ocean which leads to a moderate climate, abundant brackish lakes and ponds, and Maritime Boreal ecosites dominated by balsam fir, black spruce, and white spruce (*Picea glauca*) (Neily et al., 2017). A small portion of the Study Area is in the Nova Scotia Uplands Ecoregion, though no infrastructure is planned for this area.

Within the Eastern Ecoregion, the northwestern portion of the Study Area lies within the Eastern Interior Ecodistrict (440) (Drawing 7.1). This ecodistrict is the largest in Nova Scotia and has an average elevation of only 95 masl with gradually rolling topography throughout. Forested areas within this ecodistrict are influenced by the depth of underlying soils (Neily et al., 2017). Soil profiles include impoverished shallow soils, deep well-drained soils, and imperfectly to poorly drained soils. The Spruce Pine (SP) forest group is widely dispersed along nutrient-poor soils; the potential development of old-growth characteristics within this forest group is limited by the natural disturbance regime (e.g., hurricanes, insects, fire). Even-aged black spruce forests with an understory dominated by ericaceous shrubs are common on imperfectly drained soils with hummocky to level terrain, whereas wet open woodlands with limited stocking of trees may occur on poorly drained soils. Non-forested uplands are largely composed of low heathlands with lambkill, rhodora (*Rhododendron canadense*), huckleberries, and blueberries most dominant (Neily et al., 2017).

The remainder of the Study Area is in the Eastern Shore Ecodistrict (820) (Drawing 7.1), which flanks the eastern shore of Nova Scotia from Chedabucto Bay to St. Margaret's Bay. This narrow ecological landscape is highly exposed along the eastern shore and experiences strong winds, extended periods of fog, and a cold climate. Exposed headlands may support conditions associated with Maritime Boreal ecosites as the oceanic influence extends inland until topographical features restrict further penetration. About one fifth of the land area includes sparsely vegetated exposed bedrock occupied by lichens and/or mosses (Neily et al., 2017). Hydric soil is common due to hummocky terrain, shallow soil profiles, and abundant moisture. Even-aged forests are common along the eastern shore, where strong winds and disturbance from insects and disease create opportunities for advanced tree regeneration and limit the potential for old forest development. Natural senescence further promotes the development of even-aged forests, with both softwood and hardwood stands restricted to ages of 100 to 125

years. Maritime Boreal coastal forests dominate this ecodistrict, which are typified by balsam fir, black spruce, and white spruce trees and a shrub layer dominated by regenerating balsam fir, lambkill, wild raisin, and American mountain ash (*Sorbus Noamericana*) (Neily et al., 2017).

The NSNR Wetlands Inventory (NSNR, 2021k) indicates that wetlands, which are known to support a variety of vegetation communities and flora species, are present throughout the Study Area, with wetlands most concentrated in the southwestern extent. Detailed characterizations of wetlands within the Assessment Area are provided in Section 9.2.

Vegetation Communities

The desktop assessment of vegetation communities included the use of geospatial data to understand the abundance and distribution of major land cover types (vegetation communities and disturbed areas) within various Project boundaries. The land cover model was developed using data from the Nova Scotia Forest Inventory (NSNR, 2021f), WAM Database (NSECC, 2022c), Provincial Crown Land Harvest Plan Archive (NSNR, 2025a), and Canopy Height Model (GeoNOVA, 2024a), which were reclassified, combined, and reviewed for accuracy against high-resolution aerial imagery (dated July 2022) (Drawing 10.1A to 10.1R). Note that in the resulting model, cutover areas include harvested forest stands identified in the Forest Inventory (NSNR, 2021f), as well as stands in the Provincial Crown Land Harvest Plan Archive (NSNR, 2025a). It is possible that harvesting in some stands in the Crown Land Harvest Plan Archive (NSNR, 2025a) have not been harvested as these locations represent proposed harvest plans; however, inspection of this layer against aerial imagery confirmed that the vast majority of the stands identified in this layer correspond to cutovers. Finally, an unknown additional amount of cutover area not captured by either the Forest Inventory (NSNR, 2021f) or the Crown Land Harvest Plan Archive (NSNR, 2025a) generally fall into the “open areas” class due to having a low canopy height. The extent of each land cover type within the Clearing Footprint (the area to be cleared for construction and the placement of Project infrastructure), the Study Area, and the Study Area plus a 5 km buffer is provided in Table 10.1.

Table 10.1: Land Cover Types within and Surrounding the Study Area

Land Cover Type	Clearing Footprint		Study Area		5 km of the Study Area ⁽³⁾	
	ha	%	ha	%	ha	%
Hardwood Forest	107.3	6.3	1,131.7	5.1	4,107.3	6.8
Hardwood Wet Forest	2.9	0.2	38.8	0.2	127.4	0.2
Mixedwood Forest	100.9	5.9	1,197.5	5.4	4,852.0	8.0
Mixedwood Wet Forest	6.4	0.4	78.5	0.4	312.0	0.5
Softwood Forest	378.1	22.0	5,367.2	24.3	16,432.4	27.1
Softwood Wet Forest	68.3	4.0	1,265.5	5.7	3,081.3	5.1
Shrub/Alders	52.5	3.1	570.1	2.6	1,829.4	3.0
Open Wetland	31.8	1.9	2,198.8	10.0	4,774.2	7.9
Cutover ⁽¹⁾ Upland	321.4	18.7	2,958.5	13.4	6,008.2	9.9
Cutover ⁽¹⁾ Wetland	6.3	0.4	108.2	0.5	287.7	0.5

Land Cover Type	Clearing Footprint		Study Area		5 km of the Study Area ⁽³⁾	
	ha	%	ha	%	ha	%
Urban/Developed	25.5	1.5	94.5	0.4	1,195.3	2.0
Open Areas ⁽²⁾	612.4	35.7	5,776.7	26.2	13,475.6	22.2
Water	2.2	0.1	1,269.9	5.8	4,082.8	6.7
Total	1,716.1	100.0	22,055.9	100.0	60,565.6	100.0

⁽¹⁾Cutover class represents harvested and/or windthrow/dead forest areas as identified in the Forest Inventory and Crown Land Harvest Plant Archive.

⁽²⁾Open areas include landscapes with low/no canopy height, such as barrens and agricultural fields, as well as harvested areas not captured by the cutover class.

⁽³⁾This area represents the RAA for Terrestrial Vegetation Communities and Flora, as described in Section 10.1.6

Source: Land cover types derived from provincial WAM Database (NSECC, 2022c), Provincial Crown Land Harvest Plan Archive (NSNR, 2025a), Canopy Height (GeoNOVA, 2024a), and Forest Inventory Data (NSNR, 2021f).

The land cover classification indicates that the Study Area is dominated by open areas (26.2%) and softwood forest (24.3%), with cutover uplands being the next most abundant cover type (13.4%). On a proportional basis, the cover types within the Clearing Footprint, Study Area, and the surrounding 5 km are comparable except for the distribution of wetlands, cutovers, and open areas. The percentage of open wetlands in the Clearing Footprint is much lower (1.9%) than the Study Area (10.0%) or surroundings (7.9%), whereas the percentage of cutovers and open areas are both higher in the Clearing Footprint (18.7% and 35.7%) than the Study Area (13.4% and 26.2%) or surrounding 5 km (9.9% and 22.2%).

Old-growth forest stands hold high ecological and cultural value and are known to support high levels of biodiversity (NSNR, 2022a). To identify areas with elevated potential for encountering old-growth forests within the Study Area, the Old-Growth Policy layer and Old-Growth Potential Index (OGPI) layer provided by NSNR (2025b) were reviewed. The Old-Growth Forest Policy layer is a database of stands protected under the Old-Growth Forest Policy, whereas the OGPI is a desktop tool intended to guide forest management and land use decisions. The OGPI ranks forest stands from 0 to 11 based on their height in comparison to stands with the same tree cover and ecological site conditions. Stands ranking seven or higher are included in the resulting layer due to their elevated potential to be old growth.

There are 17 stands protected under the Old-Growth Forest Policy within the Study Area (Drawing 10.2). Additionally, several potential old-growth forest polygons were identified as overlapping with the Assessment Area (majority of which is on Crown land) as part of the OGPI review. A subset of these stands was selected for field assessments as described in Section 10.1.4.

Flora Species

The ACCDC data report (ACCDC, 2026a) prepared for the Project contains records associated with 51 flora species (16 vascular plants, 1 non-vascular plant, and 34 lichens) within 5 km of the Study Area (Drawing 10.2). Of these, records of eight vascular plant, one non-vascular plant, and 23 lichen species are in the Study Area (including records submitted to the ACCDC during fieldwork completed for this Project, described in Section 10.1.4). Three of the flora species recorded in the Study Area are SAR:

- Blue felt lichen (*Pectenium plumbeum*): SARA Special Concern, ESA Vulnerable, S-Rank S3 (seven records)
- Boreal felt lichen (*Erioderma pedicellatum*, Atlantic population): SARA and ESA Endangered, S-Rank S1(three records)
- Frosted glass-whiskers (*Sclerophora peronella*, Atlantic population): SARA Special Concern, S-Rank S3S4 (one record).

There are no ACCDC records associated with flora SAR in the Assessment Area; however, several flora SOCI have been recorded.

A summary of the ACCDC flora SAR and SOCI occurrence records within the Study Area is presented in Table 10.2. The complete ACCDC data report for the Project, which includes species records within 100 km of the Study Area, is provided in Appendix H.

Table 10.2: ACCDC Flora SAR and SOCI Records within the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Vascular Plants					
American Beech ⁽¹⁾	<i>Fagus grandifolia</i>	-	-	-	S3S4
Lesser Brown Sedge ⁽¹⁾	<i>Carex adusta</i>	-	-	-	S3
Michaux's Dwarf Birch	<i>Betula michauxii</i>	-	-	-	S3
Northern Burreed	<i>Sparganium hyperboreum</i>	-	-	-	S2
Northern Comandra ⁽¹⁾	<i>Geocaulon lividum</i>	-	-	-	S3S4
Southern Twayblade	<i>Neottia bifolia</i>	-	-	-	S3
Wild Celery	<i>Vallisneria americana</i>	-	-	-	S2S3
Woods-Rush	<i>Juncus subcaudatus</i>	-	-	-	S3S4
Non-Vascular Plants					
Streamside Peat Moss ⁽¹⁾	<i>Sphagnum riparium</i>	-	-	-	S3?
Lichens					
a Lichen ⁽¹⁾	<i>Fuscopannaria sorediata</i>	-	-	-	S2S3
Appressed Jellyskin Lichen ⁽¹⁾	<i>Scytinium subtile</i>	-	-	-	S3S4
Black-footed Reindeer Lichen	<i>Cladonia stygia</i>	-	-	-	S3?
Blue Felt Lichen	<i>Pectenium plumbeum</i>	Special Concern	Special Concern	Vulnerable	S3
Boreal Felt Lichen - Atlantic pop.	<i>Erioderma pedicellatum</i> (Atlantic pop.)	Endangered	Endangered	Endangered	S1
Finger Ring Lichen ⁽¹⁾	<i>Arctoparmelia incurva</i>	-	-	-	S3S4

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Fragile Coral Lichen ⁽¹⁾	<i>Sphaerophorus fragilis</i>	-	-	-	S3S4
Fringe Lichen ⁽¹⁾	<i>Heterodermia neglecta</i>	-	-	-	S3S4
Frosted Glass-whiskers (Atlantic population)	<i>Sclerophora peronella</i> (Atlantic pop.)	Special Concern	Special Concern	-	S3S4
Ghost Antler Lichen	<i>Pseudevernia cladonia</i>	Not at Risk	-	-	S2S3
Granular Soil Foam Lichen ⁽¹⁾	<i>Stereocaulon condensatum</i>	-	-	-	S3S4
Peppered Moon Lichen	<i>Sticta fuliginosa</i>	-	-	-	S3S4
Poor-man's Shingles Lichen	<i>Parmeliella parvula</i>	-	-	-	S1S2
Powdered Fringe Lichen ⁽¹⁾	<i>Heterodermia speciosa</i>	-	-	-	S3S4
Powdered Moon Lichen	<i>Sticta limbata</i>	-	-	-	S1
Red Beard Lichen	<i>Usnea rubicunda</i>	-	-	-	S2S3
Roughened Shingle Lichen ⁽¹⁾	<i>Fuscopannaria ahlneri</i>	-	-	-	S3
Salted Shell Lichen ⁽¹⁾	<i>Coccocarpia palmicola</i>	-	-	-	S3S4
Shaggy Fringed Lichen ⁽¹⁾	<i>Anaptychia palmulata</i>	-	-	-	S3S4
Spiny Heath Lichen	<i>Cetraria muricata</i>	-	-	-	S2S3
Tree Pelt Lichen ⁽¹⁾	<i>Peltigera collina</i>	-	-	-	S3
White-rimmed Shingle Lichen	<i>Fuscopannaria leucosticta</i>	Threatened	-	-	S3

Source: (ACCDC, 2026a)

⁽¹⁾Species recorded within the Assessment Area

In addition to the ACCDC data report (2026a), several geospatial resources were reviewed to further assess the potential for encountering rare lichens within and near the Assessment Area. Following the direction of the At-risk Lichens - Special Management Practices (NSNR, 2018a), a boreal felt lichen habitat layer provided by NSNR (2012a) was reviewed for areas within 100 m of the Assessment Area identified as having high potential for boreal felt lichen occurrence. The habitat model is based on the known distribution of boreal felt lichen, which is most often observed on the trunks and branches of balsam fir trees growing in/near peatlands and in close proximity (< 30 km) to the Atlantic Ocean (NSNR, 2012a). A total of 290 potential habitat features, encompassing 491 ha of land, are present within 100 m of the Assessment Area, with potential habitat most abundant in the northern portion of the Study Area. Boreal felt lichen potential habitat features identified through this review were used to inform the selection of search areas for rare lichen surveys.

The rare lichen database maintained by the Mersey Tobeatic Research Institute (MTRI) (MTRI, 2019a) includes two records of boreal felt lichen in the Study Area and one record located approximately 3 km west of the Study Area. These records correspond to occurrences reported by the ACCDC (2026a), as described above. No records of vole ears lichen (*Erioderma mollissimum*, SARA and ESA Endangered, S-Rank S1) were identified within 5 km of the Study Area (MTRI, 2019b).

The ECCC Critical Habitat Database (2025b) includes two areas of critical habitat relating to boreal felt lichen located approximately 400 m and 3 km west of the Study Area (Drawing 10.2). Critical habitat for boreal felt lichen is described in the Amended Recovery Strategy for the Boreal Felt Lichen (*Erioderma pedicellatum*), Atlantic Population, in Canada as the substrates (trees) the lichens occur upon, a critical function zone (a 500 m area around the occurrences), and their associated wetland, buffered by 50 m (ECCC, 2020a). The federal amended recovery strategy for boreal felt lichen was adopted by Nova Scotia in 2020; these critical habitat areas are therefore also considered to be core habitat (NSNR, 2020a) (but are not currently designated under ESA). No other critical habitat areas for flora species were identified within 5 km of the Study Area (ECCC, 2025b).

10.1.4 Field Assessment

10.1.4.1 *Field Assessment Methodology*

Vegetation Community Assessments

An inventory of the vegetation communities present in the Study Area was completed during various biophysical field surveys in 2023 and 2024 (e.g., flora surveys, old-growth assessments, winter tracking and pellet group surveys). Vegetation communities were classified according to the Forest Ecosystem Classification (FEC) for Nova Scotia (Neily et al., 2023) at points within or directly adjacent to the Assessment Area. During surveys, observations of the following were also recorded if encountered:

- Landscape features such as watercourses, wetlands, and caves/mine shafts
- Forest stands noted as having old-growth potential
- Vegetation communities known to serve as habitat for rare flora or that provide important lifecycle functions for moose, birds, bats, and insects

Old-Growth Forest Assessments

Old-growth forest assessments were completed between September 2023 and May 2024 in 26 forest stands with an OGPI rank ≥ 10 . All the assessed forest stands intersected with the Assessment Area at the time the fieldwork was completed; however, subsequent changes to the Project layout are such that a subset no longer intersects (described further in Section 10.1.4.2). During the assessments, field biologists with demonstrated experience conducting old-growth forest assessments travelled to pre-determined, semi-random sample plots within each stand to conduct a rapid assessment for old-growth conditions. Rapid assessments included confirming the presence of long-lived intermediate-tolerant (LIT) or late-successional

(LT) tree species (an attribute of old-growth forests) and collecting evidence of human or natural disturbances resulting in drastically altered stand composition (e.g., harvesting and blowdown; indicating that the stand is not old growth).

Where a rapid assessment was inconclusive or indicated potential for old-growth conditions, Part 1 of the old-growth scoring procedure was employed, as defined by NSNR (2024e). At each plot, a tree core was collected from one LIT/LT tree representative of the top 20% basal area for the plot and characteristic of the identified FEC vegetation type. Tree cores were processed and analyzed to determine the ages of the sampled trees which were then used to determine if stands met the criteria for old-growth status.

Flora Surveys

Vascular flora and lichen surveys were completed in the Study Area in 2023 and 2024 as follows:

- Vascular flora surveys: July 2023 and July 2024
- Lichen surveys: July 2023 and May to December 2024

The field assessment strategy for vascular flora and lichens was informed by a review of land cover data and aerial imagery. In July 2023, vascular flora surveys were completed along 11 pre-planned transects positioned throughout the Study Area to provide representative coverage of habitat types. Additionally, meandering transects were completed within and near the Assessment Area in July 2024 in all major land cover types, including wetlands, upland forests, open areas, and forestry trails. More time was spent surveying in areas more likely to support SAR and SOCI, including mature forests, wetlands, and flooded areas. During all surveys a list of all vascular flora encountered was maintained and opportunistic observations of non-vascular flora and lichens were also recorded.

In addition to vascular flora surveys, targeted surveys for rare lichens were completed in areas of suitable habitat up to 100 m outside of the Assessment Area in 2023 and 2024. Prior to completing surveys, boreal felt lichen potential habitat polygons were reviewed against aerial imagery and recent forest harvest data (NSNR, 2025c) to confirm current conditions. In-tact potential habitat polygons up to 100 m outside of the Assessment Area were prioritized for field assessments. Lichen surveys included a visual inspection of potential host trees, focusing on tree trunks, branches, and twigs.

Upon encountering flora SAR or SOCI, specimens were georeferenced, counted (when possible), photographed, and a description of their habitat was recorded. When unknown species were encountered, surveyors took photos and samples (when appropriate) to verify identification with guidebooks and/or experts as required. In addition to the prior knowledge of the surveyors, identification keys and descriptions from various print and electronic resources were used. Non-vascular flora (primarily mosses) were recorded incidentally during vascular flora and lichen surveys. Incidental observations of flora SAR and SOCI were also recorded during other biophysical surveys (e.g., wetland determinations, fauna surveys) within the Assessment Area, if observed.

While much of the Assessment Area has been surveyed for vascular flora and lichens, additional field assessments will be required in some areas where adjustments to the Project layout have occurred since flora surveys were completed (as described in Section 4.1). Most of the area requiring further survey is associated with the southwestern portion of the Study Area, with other smaller gaps present throughout the Study Area (Drawing 4.1).

10.1.4.2 Field Assessment Results

Vegetation Communities

Each of the land cover types identified through desktop review (Table 10.1) were observed during field studies in 2023 and 2024. Vegetation composition varied across the Study Area, with the southeast dominated by open barrens, treed bogs and dense shrub cover, and extensive cover of softwood dominant stands in the north and west. Historical and ongoing forestry operations have modified forest conditions in the Study Area, particularly in the north and west, which is bisected by numerous unpaved and resource access roads and forestry trails. Less evidence of human disturbance was observed in the southeastern portion of the Study Area where open and exposed barrens are common.

Six upland forest groups were identified during surveys, comprised of 19 different vegetation types/communities (Table 10.3). Four wetland forest groups were also identified, comprised of nine vegetation types. Disturbed vegetated areas were largely composed of cutovers and plant forests. Representative points for these vegetation communities are shown in Drawing 9.3A to 9.3Q.

Table 10.3: Vegetation Types Identified During Biophysical Surveys

Community Type	Forest Group ⁽¹⁾	Vegetation Type/Community
Upland Community	Coastal Boreal (CB)	CB1 (Black spruce – Balsam fir / Foxberry / Plume moss)
		CB3 (Balsam fir / Foxberry – Twinflower)
	Intolerant Hardwood (IH)	IH6 (White birch – Red maple / Sarsaparilla – Bracken)
	Mixedwood (MW)	MW1 (Red spruce – Yellow birch / Evergreen wood fern)
		MW4 (Hemlock – Red maple / Wood fern – Starflower)
		MW7 (Balsam fir – Red maple / Wood-sorrel – Goldthread)
		MW9 (Black spruce – Red maple / Bracken – Sarsaparilla)
	Spruce Hemlock (SH)	SH4 (Red spruce – White pine / Lambkill / Bracken)
		SH5 (Red spruce – Balsam fir / Schreber's moss – Stair-step moss)
		SH5a (Red spruce – Balsam fir / Schreber's

Community Type	Forest Group ⁽¹⁾	Vegetation Type/Community
		moss – Stair-step moss – Sphagnum variant)
		SH5b (Red spruce – Balsam fir / Schreber's moss – Stair-step moss – Balsam fir variant)
		SH8 (Balsam fir / Wood fern / Schreber's moss)
	Spruce Pine (SP)	SP6 (Black spruce – Balsam fir / Blueberry)
		SP7 (Black spruce / Lambkill – Wild raisin – Mountain holly)
	Tolerant Hardwood (TH)	TH1a (Sugar maple / Wood fern – Hay-scented fern – Yellow birch variant)
		TH2a (Sugar maple / New York fern – Northern beech fern – Yellow birch variant)
		TH7 (Yellow birch – White birch / Evergreen wood fern)
		TH8 (Red maple – Yellow birch / Striped maple)
		TH9 (Red maple – Sugar maple / Hay-scented fern – Evergreen wood fern)
Wetland Community	Wet Boreal (WB)	WB1 (Black spruce / Mountain ash / Foxberry / Sphagnum)
	Wet Coniferous (WC)	WC1 (Black spruce / Cinnamon fern / Sphagnum)
		WC2 (Black spruce / Lambkill – Labrador tea / Sphagnum)
		WC5 (Red spruce – Balsam fir / Cinnamon fern / Sphagnum)
		WC6 (Balsam fir / Cinnamon fern – Three seeded sedge / Sphagnum)
		WC7 (Tamarack – Black spruce / Lambkill / Sphagnum)
		WC11 (Black spruce Woodland Bogs)
	Wet Deciduous (WD)	WD2 (Red maple / Cinnamon fern / Sphagnum)
	Wet Mixedwood (WM)	WM3 (Red maple / Black spruce / Lambkill / Cinnamon fern / Sphagnum)
Other	Planted Forest (PF)	PF2 (In Situ Conifer Planted Forest)
	---	Barrens
	---	Clear cut

⁽¹⁾FEC (Neily et al., 2023)

The forest groups and vegetation types identified within and near the Assessment Area are described in detail within the following subsections.

Coastal Boreal Forest Group

Black and white spruce and balsam fir are the primary species in this partial/closed canopy forest group. Coastal winds have a role in shaping forests through disturbance and the formation of krummholz vegetation. Coastal forests provide habitat for many species of birds, particularly during migration (Neily et al., 2023).

Intolerant Hardwood Forest Group

The IH forest group is typically comprised of early to mid-successional communities with a range of soil and site conditions. Moisture and nutrient regimes range from dry to moist and poor to rich. This forest group is dominated by hardwoods such as red maple, white birch (*Betula papyrifera*), grey birch (*Betula populifolia*), trembling aspen (*Populus tremuloides*), and large-tooth aspen (*Populus grandidentata*).

Mixedwood Forest Group

The MW forest group consists early to late successional vegetation types, and these can be difficult to characterize due to variation of tree species composition. This group is dominated by a mixture of hardwood and softwood species and occurs in upland settings. Early successional stages often consist of red maple, white birch, and balsam fir, and late successional stages comprise yellow birch, red spruce (*Picea rubens*), and/or eastern hemlock (*Tsuga canadensis*) (Neily et al., 2023). Herb and bryophyte diversity are often high and extensive.

Spruce Hemlock Forest Group

The SH forest group is widespread throughout Nova Scotia and consists of mid to late successional vegetation types. The canopies of this group are dominated by shade tolerant softwoods such as balsam fir, red spruce, and eastern hemlock. The shrub layer often consists of regenerating softwoods and soils are frequently derived from glacial till. The SH group provides habitat for a diverse community of birds and mammals (Neily et al., 2023).

Spruce Pine Forest Group

Vegetation types within the SP forest group are dominated by black spruce and pine species with understories often composed of ericaceous shrubs (Neily et al., 2023). This group frequently occurs in areas of shallow, nutrient-poor soils. Soils are often very to excessively stony, especially when associated with granitic glacial till deposits. Herbaceous cover is low and dependent on light availability.

Tolerant Hardwood Forest Group

The TH forest group is characterized by mid- to late-successional hardwood stands generally composed of a closed canopy dominated by sugar maple (*Acer saccharum*), beech, yellow birch, and red maple, with balsam fir as a significant understory species. The shrub layer in TH vegetation types can be extensive and will show a high diversity and abundance of ferns. Most TH sites contain soils ranging from fresh to moist. Due to the fertile soils of TH forests, rare plants are often associated with this group (Neily et al., 2023).

Wet Boreal Forest Group

The WB forest group consists of edaphic climax forests that occur in locations where water is at or near the surface and soil fertility is low. Stands in the WB forest group often develop on wet organic or mineral soils and tend to be located within large wetland complexes (Neily et al., 2023). Natural disturbances, such as fluctuating water levels, windthrow, insects, and disease play an important role in the longevity of stands in the WB forest group. The high humidity levels of these forests stands can support several rare lichen species, including boreal felt lichen, vole ears lichen, and blue felt lichen (Neily et al., 2023).

Wet Coniferous Forest Group

This forest group has partial to closed canopies dominated by softwood tree species, and well-developed understories composed of ericaceous shrubs [e.g., mountain holly, winterberry (*Ilex verticillata*)]. Sphagnum moss is generally abundant, and herbaceous species include cinnamon fern, creeping snowberry, and sedges. In addition to serving important landscape functions (e.g., carbon and water storage, nutrient cycling), forests in the wet coniferous group provide habitat for many flora and fauna species, including rare lichens, moose (*Alces Alces*), and birds (Neily et al., 2023).

Wet Deciduous Forest Group

Forest stands in the WD forest group have water at or near the ground surface throughout most of the growing season, and partially open to closed canopies that are often dominated by red maple. Nutrient availability is moderate to high, with white ash (*Fraxinus americana*) present in areas of elevated soil richness. Natural disturbance within this group can arise from fluctuating water levels, windthrow, insects, and disease. WD forests provide habitat for a wide array of wildlife, including wood turtles (*Glyptemys insculpta*), moose, lichens, and various bird species (Neily et al., 2023).

Wet Mixedwood Forest Group

The WM forest group occurs in areas where water is present at or near the ground surface during most of the growing season. Canopies are partly open to closed, and are dominated by red maple, spruce, and balsam fir, with the prevalence of white ash correlated with nutrient availability. The shrub layer generally contains regenerating tree species, winterberry, mountain holly, and speckled alder (Neily et al., 2023). Several uncommon flora and bird species, as well as a variety of amphibians find suitable habitat conditions within this forest group.

Planted Forest Group

The PF group describes forest types that have originated by planting, including native and non-native tree species. Forest types in the PF group vary in their degree of “naturalness” (depending on harvesting history and silvicultural regimes) and are present throughout much of Nova Scotia. Stands in the PF group may be suitable for production forestry and may require silvicultural treatments to advance natural successional development.

Barrens

Barrens (or heathlands) are a non-forested ecosystem that occur in areas with harsh climatic and/or edaphic conditions. Factors such as soil moisture and wind exposure play an important role in shaping the plant communities that occur in barrens (Porter et al., 2020). The barrens identified in the Study Area were generally dominated by low-growing shrubs in areas with thin soils and exposed rock outcrops.

Clear Cut

Evidence of recent forest harvesting, including clear cuts, was observed in the Study Area, particularly in the north and west.

Summary of Vegetation Types

The Study Area is comprised of several vegetation types within the CB, IH, MW, SH, SP, TH, WB, WC, WD, WM, and PF forest groups (Drawing 9.3A to 9.3Q). Extensive open and shrub-dominated barrens were also observed in the southeastern portion of the Study Area. Of the vegetation types identified, CB1, MW1, TH1, TH2, TH8, and WC6 are known to support rare flora due to fertile soils and/or later successional stages. For example, the high levels of humidity characteristic of edaphic climax CB1 forests are known to support boreal felt lichen, vole ears lichen, and blue felt lichen. The wetland vegetation type WC6 can also occur as an edaphic climax forest with conditions that support rare lichens.

Evidence of past forestry activity was observed in the Study Area, and several of the vegetation community points captured areas that have undergone silvicultural treatments (e.g., planted forests, clear cuts) as well as early-successional forests that clearly followed human disturbance. Several vegetation types identified during field surveys (IH6, MW4, MW7, MW9, SH8, SP6, SB7, WC7, and WD2) are considered early- to mid successional forests that follow disturbances such as windthrow or harvesting. These early- to mid-successional forests, often predominantly with single layered canopy structures, are considered less complex compared to mature or late-successional forests where the flora and fauna species diversity and tree vertical complexity are generally higher. Regardless, early- to mid-successional forest vegetation communities provide a variety of ecological services to generalist species, particularly those that rely on dense understory cover and abundant browse, such as snowshoe hare (*Lepus americanus*), white-tailed deer (*Odocoileus virginianus*), and shrub-nesting birds including the chestnut-sided warbler (*Setophaga pensylvanica*) and common yellowthroat (*Geothlypis trichas*).

Old-Growth Forest Assessments

The 26 forest stands assessed for old-growth status are in the Eastern Shore and Eastern Interior Ecodistricts and had predominantly deciduous canopies comprised of yellow birch, red maple, and sugar maple (Table 10.4, Appendix K). Of the stands assessed, 20 intersect the Assessment Area, and three stands are within 100 m of the Assessment Area. The remaining three stands are located > 100 m from the Assessment Area due to changes in the Project layout since the stands were assessed (as indicated in Table 10.4).

Table 10.4: Results of Old-Growth Forest Assessments

Stand ID	Stand Size (ha)	Plot #	Species Cored ⁽¹⁾	DBH ⁽²⁾ (cm)	Height (m)	Age (years)	FEC VT ⁽³⁾	Old-Growth Reference Age (years)	Avg. Age of Cored Trees	Old-Growth Status
C026-01182	10.9	1	RM	23.6	11	95	WD2 ⁽⁴⁾	N/A	N/A	Ineligible for old-growth status
		2	YB	25.1	12	42	WD2 ⁽⁴⁾			
		3	BF	21.9	12.5	51	WC5			
		4	YB	42.8	24.5	195	WD2 ⁽⁴⁾			
		5	YB	22.6	14.5	43	WD2 ⁽⁴⁾			
C026-01943	10	1	SM	50.9	16.5	132	TH9	140	120.6	Not old growth
		2	YB	63.3	19	135	TH8			
		3	YB	60.5	16.5	123	TH8			
C026-01974	10.6	3	RS	31.6	17	70	MW2	125	116.0	Not old growth
		4	YB	44.6	15	210	MW1			
		5	RM	24.4	11	68	SH8 ⁽⁴⁾			
C026-02103	5.9	1	RS	32	12	90	MW2	125	88.4	Not old growth
		2	RM	22	12	78	SH6 ⁽⁴⁾			
		3	RM	23.9	13	86	TH8			
		4	RM	23.8	12	83	TH8			
		5	RM	25.5	15	105	MW2			
C026-02216	6	1	YB	22.5	16	35	TH7	140	96.2	Not old growth
		2	YB	43.1	18	97	TH7			
		3	SM	44.2	15	155	TH8			
		4	SM	34.9	13.5	126	TH8			
		5	BE	24.5	14.5	68	TH8			
C026-03080	10	1	YB	43.9	15.5	145	TH8	125	142.0	Old growth
		2	YB	49.7	15	127	TH8			

Stand ID	Stand Size (ha)	Plot #	Species Cored ⁽¹⁾	DBH ⁽²⁾ (cm)	Height (m)	Age (years)	FEC VT ⁽³⁾	Old-Growth Reference Age (years)	Avg. Age of Cored Trees	Old-Growth Status
		3	YB	38.6	13	174	MW1			
		4	YB	48	15.5	70	TH8			
		5	YB	47.6	25	138	TH7			
		6	YB	44.5	20	198	TH7			
C026-03113	14.5	1	YB	35.1	11	136	MW1	125	115.8	Not old growth
		2	YB	53.8	14	140	MW1			
		3	YB	38.3	16	123	MW1			
		4	RS	19.8	15	64	MW7 ⁽⁴⁾			
		5	YB	37.2	23.5	105	TH9			
		6	YB	38.6	20	127	TH2a			
C026-03848	20.5	-	-	-	-	-	-	N/A	N/A	Ineligible for old-growth status
C026-03961	19.4	1	YB	42.5	20.5	72	TH2	140	103.5	Not old growth
		2	YB	47.5	23.5	120	TH2			
		3	YB	37.8	19.5	92	TH2a			
		4	YB	56.2	22.25	110	TH2			
		5	YB	51.4	17.25	100	TH2a			
		6	RM	18.5	11.5	63	TH8			
		7	YB	39.4	24.5	171	TH2a			
		8	YB	43.4	18.25	132	TH8			
		9	YB	39.8	17.5	105	TH8			
		10	RM	32.7	20.5	70	TH8			

Stand ID	Stand Size (ha)	Plot #	Species Cored ⁽¹⁾	DBH ⁽²⁾ (cm)	Height (m)	Age (years)	FEC VT ⁽³⁾	Old-Growth Reference Age (years)	Avg. Age of Cored Trees	Old-Growth Status
C026-03982	10	1	YB	43.7	16	155	TH7	125	125	Old growth
		2	YB	43.6	14.5	135	TH7			
		3	YB	20.7	15	63	MW1			
		4	YB	39.9	14	121	TH7			
		5	YB	47.6	25	151	TH7			
C026-04698	11	1	YB	34.9	16.5	172	CB3	140	154.6	Old growth
		2	YB	32.4	10.5	96	TH8			
		3	YB	39.9	16	135	TH8			
		4	RM	25.7	13.5	76	TH8			
		5	YB	18.2	10.5	200	TH8			
		6	YB	60.9	13	173	TH8			
		7	YB	55.8	14	156	TH8			
		8	YB	41.2	13	169	TH8			
		9	YB	50.4	14.5	189	TH8			
		10	YB	50.1	18	180	TH8			
C026-04728	5.8	1	YB	38.9	11	200	TH8	140	157.0	Old growth
		2	YB	47.1	17	135	TH8			
		3	YB	50.1	18.5	143	TH8			
		4	YB	41.2	18	173	TH8			
		5	YB	52.5	15.5	175	TH8			
		6	YB	50.4	16	116	TH8			
C026-04730	6.7	1	YB	54.6	16.5	102	TH8	140	141.0	Old growth
		2	SM	46.3	16	182	TH8			
		3	YB	40.4	14.5	139	TH8			

Stand ID	Stand Size (ha)	Plot #	Species Cored ⁽¹⁾	DBH ⁽²⁾ (cm)	Height (m)	Age (years)	FEC VT ⁽³⁾	Old-Growth Reference Age (years)	Avg. Age of Cored Trees	Old-Growth Status
C026-05731	25.3	1	YB	41.8	15.5	159	TH8	140	121.7	Not old growth
		2	YB	47.1	16	121	TH8			
		3	YB	44.5	14.5	125	TH8			
		4	RS	40.9	17	63	TH8			
		5	YB	44.2	14.5	122	TH8			
		6	YB	48.9	15	180	TH8			
		7	RM	31.8	15	120	TH8			
		8	RS	34.5	12	115	TH8			
		9	YB	50.8	14.5	117	TH8			
		10	YB	42.5	15	95	TH8			
C026-05757	27.5	1	YB	41.8	15.5	145	TH8	115	126.8	Old growth
		2	YB	47.1	16	118	MW1			
		3	YB	44.5	14.5	146	MW1			
		4	RS	40.9	17	77	MW1			
		5	YB	44.2	14.5	194	TH8			
		6	YB	48.9	15	100	TH8			
		7	RM	31.8	15	64	TH8			
		8	RS	34.5	12	64	TH8			
		9	YB	50.8	14.5	220	TH8			
		10	YB	42.5	15	140	TH8			
C026-06541	4.7	1	YB	49.5	16	174	TH8	140	166.7	Old growth
		2	RM	32.1	17	124	TH8			
		3	YB	57.7	22	202	TH8			

Stand ID	Stand Size (ha)	Plot #	Species Cored ⁽¹⁾	DBH ⁽²⁾ (cm)	Height (m)	Age (years)	FEC VT ⁽³⁾	Old-Growth Reference Age (years)	Avg. Age of Cored Trees	Old-Growth Status
C026-06656	5.1	1	RM	36.1	11.5	73	SH8 ⁽⁴⁾	N/A	N/A	Ineligible for old-growth status
		2	RM	40.9	13.5	85	MW7 ⁽⁴⁾			
		3	RM	39.1	12	68	MW7 ⁽⁴⁾			
C026-06843 ⁽⁵⁾	10.2	1	BF	37.1	15.5	145	CB3	100	83.4	Not old growth
		2	YB	36.1	13	134	TH1a			
		3	YB	121	7.5	29	CB3			
		4	YB	16.8	12	86	CB3			
		5	BF	8.5	5	23	CB3			
C026-07516	16.46	1	BF	31.4	8	44	CB3	100	61.9	Not old growth
		2	BF	31.6	14	53	CB3			
		3	BF	21.3	14	82	CB3			
		4	BF	23.9	10	90	WC6 ⁽⁴⁾			
		5	BF	21.4	13	71	WC6 ⁽⁴⁾			
		6	BF	24.1	11.5	51	CB3			
		7	BF	27.8	8	75	CB3			
		8	BF	30.9	16	52	CB3			
		9	BF	28.5	16	60	CB3			
		10	BF	19.1	15	41	CB3			
C026-08567 ⁽⁵⁾	2.8	1	BS	20.1	13	88	CB3	100	100.3	Old growth
		2	RM	26.1	14.5	84	WB1 ⁽⁴⁾			
		3	RM	22.7	158	129	WB1 ⁽⁴⁾			
C026-08705	3.3	1	BF	27.8	15	52	CB1	100	67.7	Not old growth
		2	BS	25.5	9.25	91	CB1			
		3	BF	21.7	13.75	60	CB1			

Stand ID	Stand Size (ha)	Plot #	Species Cored ⁽¹⁾	DBH ⁽²⁾ (cm)	Height (m)	Age (years)	FEC VT ⁽³⁾	Old-Growth Reference Age (years)	Avg. Age of Cored Trees	Old-Growth Status
C026-09320 ⁽⁵⁾	7.4	1	T/L	20.2	8.75	36	CB3	100	77.0	Not old growth
		2	T/L	42.1	17	121	CB3			
		3	T/L	30.2	15	81	CB3			
		4	BS	30.2	14	70	CB3			
C026-09500	5.7	1	BF	29.2	13.5	43	WB1 ⁽⁴⁾	100	48.6	Not old growth
		2	BF	30.8	11	41	CB3			
		3	BF	27.4	14.5	57	CB3			
		4	T/L	29.9	15.5	50	WB1 ⁽⁴⁾			
		5	BF	24.6	12.5	52	WB1 ⁽⁴⁾			
C026-09522	1.7	1	BF	24.1	15	49	WC5	100	61.7	Not old growth
		2	BF	26.7	14	40	WC5			
		3	BF	28.4	14.5	96	WC5			
C026-10206	4.1	1	BF	17.6	12.5	74	WC5	100	77.3	Not old growth
		2	BF	21.7	13.5	93	WC5			
		3	BS	20.6	17	65	WC5			
C027-02170	2.7	-	-	-	-	-	-	N/A	N/A	Ineligible for old-growth status

⁽¹⁾BE = American Beech, BF = balsam fir, BS = black spruce, RM = red maple, RS = red spruce, SM = sugar maple, T/L = eastern tamarack, YB = yellow birch

⁽²⁾DBH = diameter breast height

⁽³⁾VT = FEC (2023) vegetation type

⁽⁴⁾VT is not eligible for old-growth status

⁽⁵⁾Stand is located > 100 m from the Assessment Area

Eight of the assessed stands meet the requirements to be considered old growth (Table 10.4, Drawing 9.3A to 9.3Q). Two stands (C026-03848 and C027-02170) were ruled out through rapid assessment as the stands showed signs of recent forest harvesting and contained only regenerating trees and did not meet old-growth forest characteristics. Two additional stands (C026-01182 and C026-06656) were considered ineligible for old growth status based on the vegetation types (early- to mid-successional) present at assessed plots. According to guidance provided by NSNR (2024e), at least 30% of plots assessed within a stand must be of an eligible vegetation type. The remaining 14 assessed stands were determined not to be old growth based on the results of tree-ring analyses (the average age of trees cored in each stand was less than the corresponding old-growth reference age).

Flora Surveys

A total of 248 vascular plant species, plus 50 bryophytes and 201 lichen species were identified during field surveys in 2023 and 2024 (Appendix L). Of these, two flora SAR, blue felt lichen (SARA Special Concern, ESA Vulnerable, S-Rank S3) and frosted glass-whiskers (SARA Special Concern, S-Rank S3S4) were identified in the Study Area. An additional five vascular plant SOCI, one non-vascular plant SOCI, and 23 lichen SOCI were also observed (Table 10.5 and Drawing 9.3A to 9.3Q). The majority of SAR and SOCI occurrences are in the north and western portion of the Study Area with fewer observations recorded in the southeast (Drawing 9.3A to 9.3Q). No evidence of boreal felt lichen, a SAR known to occur in the Study Area (ACCDC, 2026a), was observed during flora surveys, including targeted surveys of potential habitat polygons.

Table 10.5: Flora SAR and SOCI Observed in the Study Area and Assessment Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	No. of Occurrences ⁽¹⁾ in Assessment Area / Study Area
Vascular Plants						
American Beech	<i>Fagus grandifolia</i>	-	-	-	S3S4	14 / 16 ⁽²⁾
Lesser Brown Sedge	<i>Carex adusta</i>	-	-	-	S3	1 / 1
Northern Comandra	<i>Geocaulon lividum</i>	-	-	-	S3S4	1 / 2
Southern Twayblade	<i>Neottia bifolia</i>	-	-	-	S3	0 / 1
Wild Celery	<i>Vallisneria americana</i>	-	-	-	S2S3	0 / 1
Non-vascular Plants						
Streamside Peat Moss	<i>Sphagnum riparium</i>	-	-	-	S3?	1 / 1

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	No. of Occurrences ⁽¹⁾ in Assessment Area / Study Area
Lichens						
A Lichen	<i>Fuscopannaria soredata</i>	-	-	-	S2S3	2 / 13
A Stubble Lichen	<i>Chaenotheca brachypoda</i>	-	-	-	S3S4	1 / 2
Appressed Jellyskin Lichen	<i>Scytinium subtile</i>	-	-	-	S3S4	1 / 4
Birdnest Jellyskin Lichen	<i>Scytinium tenuissimum</i>	-	-	-	S2S3	1 / 1
Black-footed Reindeer Lichen	<i>Cladonia stygia</i>	-	-	-	S3?	3 / 7
Blue Felt Lichen	<i>Pectenien plumbea</i>	Special Concern	Special Concern	Vulnerable	S3	3 / 31
Blue-gray Moss Shingle Lichen	<i>Moelleropsis nebulosa ssp. frullaniae</i>	-	-	-	S2S3	0 / 3
Finger Ring Lichen	<i>Arctoparmelia incurva</i>	-	-	-	S3S4	11 / 33
Fragile Coral Lichen	<i>Sphaerophorus fragilis</i>	-	-	-	S3S4	5 / 14
Fringe Lichen	<i>Heterodermia neglecta</i>	-	-	-	S3S4	4 / 18
Frosted Glass-whiskers (Atlantic Population)	<i>Sclerophora peronella</i>	Special Concern	Special Concern	-	S3S4	3 / 5
Ghost Antler Lichen	<i>Pseudevernia cladonia</i>	-	-	-	S2S3	0 / 1
Granular Soil Form Lichen	<i>Stereocaulon condensatum</i>	-	-	-	S3S4	5 / 5
Oldgrowth Rag Lichen	<i>Platismatia norvegica</i>	-	-	-	S3	0 / 2
Peppered Moon Lichen	<i>Sticta fuliginosa</i>	-	-	-	S3S4	0 / 10
Perforated Ruffle Lichen	<i>Parmotrema perforatum</i>	-	-	-	S3S4	1 / 1

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	No. of Occurrences ⁽¹⁾ in Assessment Area / Study Area
Poor-man's Shingles Lichen	<i>Parmeliella parvula</i>	-	-	-	S1S2	0 / 1
Powdered Fringe Lichen	<i>Heterodermia speciosa</i>	-	-	-	S3S4	0 / 3
Powdered Moon Lichen	<i>Sticta limbata</i>	-	-	-	S1	0 / 5
Roughened Shingle Lichen	<i>Fuscopannaria ahlneri</i>	-	-	-	S3	7 / 26
Salted Shell Lichen	<i>Coccocarpia palmicola</i>	-	-	-	S3S4	1 / 21
Shaggy Fringed Lichen	<i>Anaptychia palmulata</i>	-	-	-	S3S4	2 / 12
Shelter Shingle Lichen	<i>Vahliella leucophaea</i>	-	-	-	S3S4	0 / 1
Tree Pelt Lichen	<i>Peltigera collina</i>	-	-	-	S3	4 / 11
White-rimmed Shingle Lichen	<i>Fuscopannaria leucosticta</i>	-	-	-	S3	0 / 2

Source: (ACCDC, 2026b)

⁽¹⁾Occurrences represent locations where one more individuals of a species were observed during field surveys

⁽²⁾As the species is relatively widespread throughout the Study Area, not all occurrences were recorded.

Descriptions of Priority Species

The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a) was used to identify any priority species and habitat associated with this Project. All terrestrial flora SAR and SOCI and their respective habitat associations identified within the Study Area through desktop review and field inventory were initially considered. Only those terrestrial flora SAR and SOCI, and their respective habitats, with potential to interact with the Project have been designated as Project-specific priority species. Interactions may include removal or disturbance of a SAR or SOCI and/or their associated habitat.

These priority species include the following SAR identified within the Assessment Area (including the desktop review):

- Blue felt lichen
- Boreal felt lichen (though not observed during field assessments, this species was included due to its protection status, combined with the historical observations and presence of suitable habitat within the Study Area)
- Frosted-glass whiskers

As well as the following SOCI identified within the Assessment Area:

- American beech
- Lesser brown sedge
- Northern comandra
- Streamside peat moss
- A lichen
- A stubble lichen
- Appressed jellyskin lichen
- Birdnest jellyskin lichen
- Black-footed reindeer lichen
- Finger ring lichen
- Fragile coral lichen
- Fringe lichen
- Granular soil foam lichen
- Perforated ruffle lichen
- Roughened shingle lichen
- Salted shell lichen
- Shaggy fringed lichen
- Tree pelt lichen

Blue Felt Lichen

Blue felt lichen is listed as Special Concern under SARA and Vulnerable under ESA (S-Rank S3) and was declared Nova Scotia's provincial lichen in 2022 (Nova Scotia, 2022). The species occurs in eastern North America, Europe, and Africa (NSDNR, 2025). In North America, blue felt lichen is restricted to Maine in the United States and the Atlantic provinces in Canada, where the vast majority of known occurrences are in Nova Scotia (ECCC, 2022). Blue felt lichen requires mature hardwood or mixedwood forests with high humidity, where several successional stages are present. Activities that result in the loss of host trees and creation of edge effects, including forestry, resource extraction, renewable energy developments, and industrial activities, pose a major threat to the species (NSNR, 2025). The At-Risk Lichens – Special Management Practices (NSNR, 2018a), which apply on Crown land, recommend that lands within 100 m of blue felt lichen occurrences be managed for minimal disturbance.

A total of 31 blue felt lichen occurrences were identified in the Study Area growing on red maple trees in mixedwood, tolerant hardwood, wet mixedwood, or wet coniferous forests (Drawing 9.3A to 9.3Q). Of these, three are in the Assessment Area and eight are within 100 m of the Assessment Area.

Boreal Felt Lichen

Boreal felt lichen is a foliose lichen that is greenish (when wet) or grey (when dry) in colour, with a felt-like upper surface and white underside (COSEWIC, 2014a). Mature thalli range from about 2 to 5 cm in size, with thalli less frequently growing up to 12 cm. Its reddish-brown fruiting bodies and lack of vegetative propagules distinguish boreal felt lichen from other

Erioderma species in Nova Scotia (COSEWIC, 2014a). The species requires cool and humid conditions and is most frequently found in coastal forests dominated by balsam fir. The trunks and branches of balsam fir trees are the most common substrate for boreal felt lichen thalli. The At-Risk Lichens – Special Management Practices (NSNR, 2018a), which apply on Crown land, recommend a 200 m protected zone around occurrences of boreal felt lichen that are managed for minimal disturbance, as well as a restricted zone extending from 200 m to 500 m in which development limitations may be imposed.

Several previously recorded occurrences of boreal felt lichen were identified during the desktop review (ACCD, 2026a; MTRI, 2019a) within and near the Study Area. Two areas of boreal felt lichen critical and core habitat are also present near the Study Area (ECCC, 2020a; NSNR, 2020a) (Drawing 10.2). Together, the prior observations of boreal felt lichen and presence of suitable habitat suggest there is potential for this species to occur within the Study Area, although no occurrences of boreal felt lichen were identified during field assessments.

Frosted Glass-whiskers

Frosted glass-whiskers (SARA Special Concern, S-Rank S3S4) is a minute lichen that occurs on the heartwood of hardwood trees in mature forest stands (ECCC, 2011a). The species belongs to a group known as calicioids or “stubble” lichen, due to their tiny, stalked structures, which are imbedded in substrates. Nova Scotia has the most substantial population of this species which is very rare across its range (COSEWIC, 2014b). The At-Risk Lichens – Special Management Practices (NSNR, 2018a), which apply on Crown land, recommend that lands within 100 m of occurrences of frosted glass-whiskers be managed for minimal disturbance. Five occurrences of frosted glass-whiskers were observed in the Study Area during field surveys in mature mixedwood or tolerant hardwood forests, three of which are in the Assessment Area (Drawing 9.3A to 9.3Q).

American Beech

Although historically a common tree species in the province, the health of American beech trees (S-Rank S3S4) has been affected by beech bark disease in Nova Scotia. Beech bark disease has reduced the potential for the species to mature into an overstory tree, and its ecological role has thus shifted to that of an understory or intermediate species (NSNR, 2021c). American beech were documented at 16 locations in the northern portion of the Study Area (note that not all occurrences of the species were recorded during field assessments due to the relative commonality of this species) (Drawing 9.3A to 9.3Q).

Lesser Brown Sedge

Lesser brown sedge (S-Rank S2S3) forms dense tufts and is grass-like in appearance. Its range includes much of Canada where it often occurs in disturbed, dry sites including open forests, clearings, and unpaved roadbeds (FNAA, 2025; NPT, 2024). One occurrence of lesser brown sedge was observed along a roadside in the Assessment Area (Drawing 9.3A to 9.3Q).

Northern Comandra

The uncommon Northern comandra (S3S4) is a small (7 to 30 cm), simple-leaved plant that grows in sphagnum bogs and sandy coniferous woods in Atlantic Canada (Hinds, 2000). This species produces small, greenish flowers without petals that mature into conspicuous orange-red fruits. Two occurrences of Northern comandra were recorded in wetlands in the Study Area, including WL338 near Highway 316 (Marine Drive) in the Assessment Area (Drawing 9.3A to 9.3Q).

Non-Vascular Plant and Lichen SOCI

In addition to the above lichen SAR, one non-vascular plant (streamside peat moss) and 14 lichen SOCI were observed within the Assessment Area (49 total occurrences; Drawing 9.3A to 9.3Q). These species are not described further due to the lack of specific habitat requirements associated with each.

Non-Native Flora

Non-native flora are considered species with an S-Rank of SNA (Exotic) by the ACCDC (ACCDC, 2026b). There were 12 non-native vascular plant species encountered during field surveys within and near the Assessment Area (Table 10.6). One of these species, purple loosestrife (*Lythrum salicaria*), is invasive in Nova Scotia (MTRI, 2022).

Table 10.6: Non-Native Flora Encountered During Field Surveys

Common Name	Scientific Name	Exotic Status ⁽¹⁾
Bitter Dock	<i>Rumex obtusifolius</i>	N/A
Black Raspberry	<i>Rubus occidentalis</i>	N/A
Common Apple	<i>Malus domestica</i>	N/A
Common Eyebright	<i>Euphrasia nemorosa</i>	N/A
Common Hawkweed	<i>Hieracium lachenalii</i>	Widespread
Creeping Buttercup	<i>Ranunculus repens</i>	Widespread
English Cinquefoil	<i>Potentilla anglica</i>	N/A
European Mountain Ash	<i>Sorbus aucuparia</i>	N/A
Long-leaved Dock	<i>Rumex longifolius</i>	N/A
Orange Hawkweed	<i>Pilosella aurantiaca</i>	N/A
Purple Crown-vetch	<i>Securigera varia</i>	N/A
Purple Loosestrife	<i>Lythrum salicaria</i>	Widespread

⁽¹⁾As described in the WESP-AC guide, supplementary information (Adamus, 2018)

10.1.5 Spatial Analysis

Following the completion of the desktop review and field assessments for the Project, several spatial analyses were completed to understand potential impacts of the Project on terrestrial vegetation communities and flora that are not easily captured through in-person surveys. The analyses are intended to support the effects assessments for terrestrial VCs and complement the approach to the biophysical field program.

Potential Sensitive Flora Habitat Model

A potential sensitive flora habitat model was developed by Strum to identify areas within and surrounding the Study Area with elevated potential to serve as habitat for rare flora species. The model was developed by considering the range of SAR and SOCI plant species and their associated habitat preferences that may be present in the Study Area (e.g., species identified in the desktop review and field assessments).

Plant species vary greatly in their distribution and are rarely bound to a quantifiable set of criteria. For example, some species are generalists and thrive in a wide range of environments, making it difficult to predict where they might occur. Despite this, some notable landscape characteristics are strongly associated with certain rare flora in Nova Scotia. Alluvial floodplains are a subset of wetlands that have rich, moist soils suitable for several rare plant species (NSNR, 2018c). Calcareous surficial geology, commonly characterized by limestone and/or barrens, creates more alkaline soil conditions preferred by rare flora such as orchids (NSNR, 2020b). Thus, these habitats, along with the preferred south-facing slopes, were the primary targets of the modelling exercise.

Several spatial layers were created using LiDAR (GeoNOVA, 2024b) and surficial geology data (NSNR, 2006) to represent habitat characteristics preferred by several rare species. LiDAR was used to identify areas of intact forest, surface water (floodplains), and directional exposure, while surficial geology was referenced to identify the presence of moderate drainage and transported calcareous bedrock components. The final model layer depicts areas greater than 1,000 m² (0.1 ha) where one or more of these conditions exist (Drawing 10.3).

A total of 307.07 ha of modelled potential sensitive flora habitat was identified within the Study Area (Drawing 10.3).

Edge Effects Analysis

To assess the potential impacts of the Project on habitat fragmentation, spatial analyses were completed to estimate the amount of new edge habitat that will be created by the construction of the Project. As it relates to human land disturbance, edge effects occur when the impacts of land disturbance extend beyond a disturbed footprint into the surrounding landscape (ABMI, 2024). Estimating the extent of edge habitat created by the Project included identification of the following:

- The locations of existing intact forest stands.
- Areas that currently experience edge effects due to recent human land disturbance.
- Areas of new edge habitat associated with the Clearing Footprint.

For the purposes of the analysis, areas of “intact forest” are considered the land cover type that, when cleared for the Project, will create edge effects on the surrounding environment. Areas of intact forest were identified by first categorizing data from the provincial canopy height model (GeoNOVA, 2024a) into 2 m interval bins. The mean bin value was then determined across a 100 m² hexagonal grid (approximately 10 m wide) to capture neighbourhood-scale

canopy patterns. Zones with a mean value of “8” or higher were retained, providing a generalized, upper-bound approximation of areas whose true mean canopy height exceeds approximately 6 m. Through a review of different height thresholds, 6 m was identified as providing a suitable representation of cohesive canopy closure.

Next, data from the Crown harvest plan archive (NSNR, 2025a) were used to remove harvested forest polygons (2016-2025) that may not be reflected in the provincial canopy height model (which has coverage from 2016 to 2018). No other sources of forest harvest data were used as the canopy height model provides a more current depiction of canopy conditions (e.g., the forest inventory dataset is dated to 2007-2008). If a stand protected under the Old-Growth Forest Policy (NSNR, 2022a, 2026) overlapped an area identified in the Crown harvest plan archive (NSNR, 2025a), the boundary of the old-growth stand took precedence and was not assumed to be harvested. Finally, small or isolated forest patches were removed by filtering out polygons composed of one or two hexagons (totaling less than 205 m²), as these represent individual trees or very small clusters not relevant to the identification of continuous canopy coverage indicative of intact forest.

Data from the Crown harvest plan archive (NSNR, 2025a) were then used to remove harvested forest polygons (2016-2025) that may not be reflected in the provincial canopy height model (which has coverage from 2016 to 2018). No other sources of forest harvest data were used as the canopy height model provides a more current depiction of canopy conditions (e.g., the forest inventory dataset is dated to 2007-2008). If a stand protected under the Old-Growth Forest Policy (NSNR, 2022a, 2026) overlapped an area identified in the Crown harvest plan archive (NSNR, 2025a), the boundary of the old-growth stand took precedence and was not assumed to be harvested. Finally, small or isolated forest patches were removed by filtering out polygons composed of one or two hexagons (totaling less than 205 m²), as these represent individual trees or very small clusters not relevant to the identification of continuous canopy coverage indicative of intact forest.

Prior to identifying new areas of edge habitat associated with the Project, areas of existing edge habitat were identified by buffering polygons in the Crown harvest plan archive by 100 m to represent edge habitat that has been created in the past 10 years. The 100 m buffer distance was selected to capture the depth of influence that vegetation clearing can be expected have on its surroundings based on the typical range of values reported in the literature (Gauslaa et al., 2019; Rheult et al., 2002). Any intact forest overlapping this buffered area was classified as experiencing existing edge habitat and the remaining area is considered to approximate areas of intact “interior” forest habitat [interior forests are considered forests located 100 m from a forest edge (NSNR, 2022a)].

Finally, to identify new areas of potential edge habitat associated with the Project, the intact interior forest layer was overlaid with a 100 m buffer of the Clearing Footprint. Areas of overlap between intact interior forest and this edge effect buffer (i.e., areas not already under existing edge effect and excluding areas in the Clearing Footprint itself) were classified as having potential to experience edge effects due to the Project.

A total of 123.4 ha of intact interior forest coincides with Clearing Footprint, with an additional 358.5 ha of edge habitat created (Drawing 10.4A to 10.4F). In the Study Area, there is 1,720.9 ha of unimpacted intact interior forest, with 9,870.5 ha within 5 km of the Study Area.

10.1.6 Effects Assessment

Project-Terrestrial Vegetation Community and Flora Species Interactions

Project activities, primarily those that involve earth-moving and/or vegetation removal, have the potential to impact terrestrial vegetation communities and flora (Table 10.7).

Table 10.7: Potential Project Interactions with Terrestrial Vegetation Communities and Flora Species

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	X
Decommissioning	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries

The LAA for terrestrial vegetation communities and flora is a 100 m buffer of the Clearing Footprint (Drawing 10.5). This area was selected to assess the direct and indirect impacts of the Project on vegetation communities and flora. The RAA is the Study Area plus a 5 km buffer including only the contiguous mainland. This area was selected to contextualize the impacts to terrestrial vegetation communities and flora within the broader landscape (Drawing 10.5).

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for terrestrial habitat. The VC-specific definition for magnitude is as follows:

- Negligible: No loss or alteration of sensitive vegetation communities; no loss of flora SAR or SOCI individuals; no loss of, or effect on habitat supporting flora SAR or SOCI.
- Low: Small loss or alteration of sensitive vegetation communities; no flora SAR or SOCI individuals lost; small loss of, or effect on habitat supporting flora SAR or SOCI.
- Moderate: Moderate loss or alteration of sensitive vegetation communities; small loss of flora SAR or SOCI individuals that do not have legislated protection status, but their populations remain largely intact; moderate loss of, or effects on habitat supporting flora SAR or SOCI.
- High: High loss or alteration of sensitive vegetation communities; loss of flora SAR that does have legislative protection status and/or loss of an entire population of terrestrial flora SAR or SOCI; high loss of, or effect on habitat supporting flora SAR or SOCI.

Effects

Project activities have the potential to impact vegetation communities and flora through:

- Loss of sensitive vegetation communities
- Loss of flora SAR or SOCI and impacts on supporting habitat
- Indirect effects on vegetation communities and flora

Loss of Sensitive Vegetation Communities

It is expected that up to 1,716 ha of land will be developed to support the placement of temporary and permanent Project infrastructure (i.e., the Clearing Footprint), a large portion of which consists of vegetated land. Although all vegetation communities have inherent ecological value, the broader impacts of land development are driven not only by the overall area affected, but also by the sensitivity of the communities that are impacted. For example, a vegetation community may have high sensitivity to disturbance due to being regionally uncommon (e.g., a community with highly specialized habitat requirements or that has been significantly reduced by historical land disturbance) or because it supports an abundance of rare or diverse species. These vegetation communities and the ecological services they provide are difficult to restore once they are lost, and small impacts to sensitive vegetation communities can disproportionately affect species and habitat diversity at a landscape scale. The assessment of Project impacts on vegetation communities therefore focuses on sensitive vegetation communities in addition to considering the overall impacts on land cover.

The land cover model developed in the desktop review offers a means to quantify the expected loss of vegetated areas and identify which cover types will be most impacted by the Project. Based on Table 10.8, open areas (612.4 ha), softwood forest (378.1 ha), and cutover uplands (321.4 ha) are the dominant cover types in the Clearing Footprint, accounting for 1,311.9 ha of the 1,716.1 ha total area (76.5% of the Clearing Footprint). Approximately 21% of the Clearing Footprint is represented by land cover types with previous disturbance (i.e., cutover wetland, cutover upland, and urban/developed).

When contextualized within the land cover present in the LAA, the Clearing Footprint is expected to have concentrated impacts on urban/developed land (66.6% of the amount

available in the LAA) and uses a disproportionately low amount of open wetland (10.0%). At the scale of the RAA, cutover uplands are the land cover type that will experience the highest proportional impacts due to the Clearing Footprint (5.4%), highlighting the prioritization of disturbed areas in determining the Project layout. In general, impacts to forest cover types (e.g., hardwood and mixedwood forest) are proportional to the amounts available in the LAA and RAA.

Table 10.8: Direct Impacts to Land Cover Relative to the LAA and RAA

Land Cover Class	Approximate Hectares Cleared for the Project	LAA		RAA	
		Hectares Available	% Cleared	Hectares Available	% Cleared
Hardwood Forest	107.3	361.0	29.7	4,107.3	2.6
Hardwood Wet Forest	2.9	10.9	26.4	127.4	2.2
Mixedwood Forest	100.9	345.0	29.3	4,852.0	2.1
Mixedwood Wet Forest	6.4	23.0	28.0	312.0	2.1
Softwood Forest	378.1	1,413.0	26.8	16,432.4	2.3
Softwood Wet Forest	68.3	308.8	22.1	3,081.3	2.2
Shrub/Alders	52.5	166.5	31.5	1,829.4	2.9
Open Wetland	31.8	319.7	10.0	4,774.2	0.7
Cutover Upland	321.4	1,064.9	30.2	6,008.2	5.4
Cutover Wetland	6.3	27.3	23.0	287.7	2.2
Urban/Developed	25.5	38.3	66.6	1,195.3	2.1
Open Areas	612.4	1,972.8	31.0	13,475.6	4.5
Water	2.2	41.3	5.3	4,082.8	0.1
Total	1,716.1	6,092.5	28.2⁽¹⁾	60,565.6	2.8⁽¹⁾

⁽¹⁾Percentage of land cleared for the Project relative to the total size of the LAA and RAA. Percentages in the “% Cleared” columns that are higher/lower than these values represent disproportionately high/low impacts.

Source: Landcover types predictions derived from provincial WAM Database (NSECC, 2022c), Provincial Crown Harvest Plan Archive (NSNR, 2025a), Canopy Height (GeoNOVA, 2024a), and Forest Inventory Data (NSNR, 2021f).

Details about the vegetation communities with potential to interact with the Project can also be inferred from the vegetation community assessments completed during field surveys, although the extent to which these communities are present in the Clearing Footprint is not precisely known. During field surveys, much of the southeastern portion of the Study Area, where most new Project roads will be located, was observed to be dominated by open barrens and shrub-covered areas with a lower diversity and abundance of rare flora species than the north and west. In contrast, forest types associated with fertile soils and/or later successional stages (e.g., CB1, MW1, TH2, TH8) were more frequently observed in the northern and western portion of the Study Area, and these areas have a higher potential to support rare or diverse flora relative to the southeast. Importantly, extensive evidence of forest harvesting was also observed in the north and west, including an abundance of early- to mid-successional and planted forests. These forest types often follow stand-level disturbances such as forest harvesting, and though they provide habitat for a variety of generalist flora and fauna species

(Neily et al., 2023), early- to mid-successional and planted forests generally support fewer rare species and are less diverse than late successional forests. In the northern and western portion of the Study Area, the Project has prioritized the placement of infrastructure in disturbed areas such as recent harvests and young regenerating forest stands, which has helped to limit the impacts of the Project on sensitive vegetation communities.

Though many of the vegetation communities that make up old-growth forest stands are not particularly uncommon in Nova Scotia, old-growth forests themselves generally have a limited distribution in the province due to the impacts of historical and on-going land development, and the long time period required for old-growth characteristics to develop (NSNR, 2022a). These characteristics, as well as the high levels of diversity they support (NSNR, 2022a), make old-growth forest stands highly sensitive to land disturbance. Several stands protected under the Old Growth Forest Policy (NSNR, 2022a) as well as high-ranking potential old-growth stands were identified in the Study Area during the desktop review, and eight stands were confirmed to be old-growth during field assessments.

Seven of the eight field-confirmed old-growth stands intersect with the Assessment Area in locations planned for new roads, upgrades to existing roads, and/or the construction of turbines. The remaining stand (C026-08567) is located > 100 m from the Assessment Area as a result of modifications to the Project layout that have occurred since the surveys were completed. In some cases, the layout of the Clearing Footprint has been adjusted to avoid direct impacts to old-growth stands (C026-06541) or limit the impacts of new road and turbine pad development to areas that have been recently disturbed by forest harvesting (C026-04698 and C026-04728). The remaining areas of overlap are associated with planned upgrades to existing roads that bisect or are adjacent to a field confirmed old-growth stand (C026-03080, C026-04698, C026-04728, C026-04730, and C026-05757), locations planned for turbine construction (C026-03982, C026-04730), and an area of new road development (C026-03982). The potential for impacts to field-confirmed old-growth forest stands and requirements for further surveys will be confirmed through engagement with NSNR during the Crown lands permitting process. It is expected that additional refinement of the Clearing Footprint during the detail design stage (e.g., limiting clearing to the side of an existing road away from a confirmed old-growth stand) will help to further minimize direct impacts to field-confirmed old-growth stands.

In addition to field-confirmed old-growth stands, several forest stands protected under the Old-Growth Forest Policy (NSNR, 2022a) are present in the vicinity of the Project. The locations of these stands have been incorporated into the layout of the Clearing Footprint such that most areas of overlap are associated with land that has been previously disturbed by road construction. The Proponent is committed to minimizing the extent of new disturbance associated with upgrades to existing roads that bisect protected old-growth stands. Potential impacts to protected stands, including small additional areas of overlap with a proposed road and turbine pad, will be confirmed through engagement with NSNR during the Crown lands permitting process.

Overall, the direct impacts of the Project on vegetation communities are expected to be low due to prioritizing the placement of the Clearing Footprint in previously disturbed areas (e.g., cutovers and existing roads) and maximizing avoidance of sensitive features such as old-growth forests where practicable. None of the vegetated land cover types or vegetation communities identified during the desktop review or field assessments are considered unique or rare in the local, regional, or provincial context, and are expected to remain abundant in the LAA and RAA following the construction of the Project. Direct impacts to vegetation communities will be limited to the Clearing Footprint and will occur during the initial site preparation and construction phase. Within the Clearing Footprint, losses of vegetation cover will be permanent in some areas (e.g., roads, turbine pads), whereas vegetation in areas such as roadsides and construction laydowns will be allowed to regrow during the operations phase. Allowing vegetation regrowth and further restoration of the Clearing Footprint during decommissioning will reduce the duration and area of overall vegetation loss. However, the composition of newly established communities will likely differ from pre-clearing conditions, such that impacts are expected to be only partially reversible.

Loss of Flora SAR or SOCI and Impacts on Supporting Habitat

Activities requiring ground disturbance and vegetation clearing during the site preparation and construction phase have the potential to impact flora SAR and SOCI individuals. Throughout the planning phase of the Project, information from the desktop review and the results of subsequent field surveys were used to iteratively update the layout of Project components to maximize avoidance of field-observed SAR and SOCI and their associated habitat. The anticipated effects of the Project on flora SAR and SOCI are described in the following sections.

Boreal Felt Lichen

Several previously recorded occurrences of boreal felt lichen (SARA and ESA Endangered, S-Rank S1) were identified within the Study Area and RAA during the desktop review (ACCDC, 2026a; MTRI, 2019a), three of which are in the Study Area. The nearest Project infrastructure to these occurrences consists of a new road and turbine pad over 300 m from the northernmost occurrence, and an existing road located over 700 m from the remaining two occurrences. Two critical and core habitat areas for the species are also present within the RAA (ECCC, 2020a; NSNR, 2020a) (Drawing 10.2), with no areas of identified critical or core habitat present in the Study Area. Though suitable habitat for boreal felt lichen is present in the Study Area, no occurrences of this species were observed during field assessments, including attempts to relocate the records reported by the ACCDC. Based on a lack of field observations and the separation of the Project from previously recorded boreal felt lichen occurrences, no direct impacts to this species are expected. The Clearing Footprint is > 300 m from the nearest boreal felt lichen occurrence record, such that impacts to supporting habitat are also expected to be low [the At-Risk Lichens – Special Management Practices (NSNR, 2018a) recommends a 200 m protected zone around occurrences of boreal felt lichen as well as a restricted zone extending from 200 m to 500 m in which development limitations may be imposed.

Blue Felt Lichen

Observations of blue felt lichen (SARA Special Concern, ESA Vulnerable, S-Rank S3) were relatively abundant during field surveys, with 31 occurrences identified in the Study Area. The locations of blue felt lichen have been incorporated into the layout of the Project to minimize direct impacts to this species and maintain undisturbed buffers where practicable. As a result, the Clearing Footprint has avoided all but three of the 31 field-confirmed occurrences. These remaining occurrences are located adjacent to existing roads, and direct losses will be minimized, as practicable, by completing any required road upgrades in the direction opposite from where the species was observed or otherwise maximizing separation with Project activities. If impacts to these occurrences are determined to be unavoidable, the Proponent is committed to working with NSNR through the SAR permitting process.

In addition to the three occurrences in the Clearing Footprint, five additional occurrences in one general location are within 40 m of the Clearing Footprint. No direct impacts to these occurrences, which are next to an existing road, are expected.

Indirect impacts through alteration of supporting habitat are possible for these eight occurrences within or near the Clearing Footprint, where encroachments within the 100 m buffer recommended in the At-Risk Lichens – Special Management Practices (NSNR, 2018a) are required. The remaining 23 occurrences identified during field surveys are not expected to interact with the Project and 100 m buffers are expected to be maintained.

Frosted Glass-whiskers

Three occurrences of frosted glass-whiskers (SARA Special Concern, S-Rank S3S4) were recorded in the Assessment Area during field surveys, two of which are in an area planned for turbine construction. Direct impacts to these individuals have been avoided through adjustments to the Clearing Footprint. The third occurrence is in an area planned for a new road, and efforts will be made during the detailed design stage to avoid direct impacts to this occurrence. Indirect impacts to these three occurrences are possible through alterations to supporting habitat [e.g., the 100 m buffer recommended in the At-Risk Lichens – Special Management Practices (NSNR, 2018a) will not be maintained].

American Beech

American beech (S-Rank S3S4) were observed in several locations in the northern portion of the Study Area, including 14 occurrences in the Assessment Area. Of these, 12 are located next to existing roads, one is in an area planned for new road construction, and one is in an area planned for a turbine pad. Due to their proximity to planned infrastructure, it is likely that individuals near new and existing roads will be lost due to vegetation clearing. The occurrence associated with a turbine pad is approximately 50 m from the Clearing Footprint and will be avoided. In addition to the American beech observed during field surveys, species occurrence records were also identified in the northern portion of the RAA in the ACCDC data report (ACCDC, 2026a). Although some individuals will be lost due to the Project, it is expected that the species will continue to persist in areas of suitable habitat in the RAA following the construction of the Project.

Lesser Brown Sedge

One occurrence of lesser brown sedge (S-Rank S2S3) was observed in the Clearing Footprint directly adjacent to an existing road. It is expected that this occurrence will be lost due to vegetation clearing associated with road upgrades.

Northern Comandra

One occurrence of northern comandra (S-Rank S3S4) was observed in a wetland (WL338) in the Clearing Footprint adjacent to Highway 316 (Marine Drive). If upgrades to this road are required, this occurrence will likely be lost due to vegetation clearing.

Non-Vascular Plant and Lichen SOCI

In addition to the lichen SAR and vascular flora SOCI described above, impacts to occurrences of non-vascular plant and lichen SOCI are also expected. A total of 25 occurrences of 12 non-vascular plant and lichen SOCI were made within the Clearing Footprint. The occurrences are in areas planned for road construction and upgrades, and it is likely that some or all these occurrences will be impacted by vegetation clearing. Apart from streamside peat moss (S-Rank S3?), birdnest jellyskin lichen (S-Rank S2S3), and perforated ruffle lichen (S-Rank S3S4), all of these species were also observed in other parts of the Study Area that will not be impacted by the Project.

Sensitive Flora Habitat

To quantify the impacts of the Project on rare flora habitat, including areas not directly captured through field assessments, the sensitive flora habitat model developed for the Project (described in Section 10.1.5) was overlaid with the Clearing Footprint and the amount of intersecting modelled habitat was determined. A total of 10.3 ha of modelled sensitive flora habitat is within the Clearing Footprint, which makes up 28.8% of the amount modelled within the LAA, and < 1% of the amount modelled within the RAA. The sensitive flora habitat in the Clearing Footprint is mainly associated with areas of intact forest (associated with floodplains or south-facing slopes), whereas the RAA also contains an abundance of intact forest areas underlain by calcareous geological features. This indicates that habitat within the RAA offers a higher diversity of habitat types for sensitive flora species than the Clearing Footprint. As visible in Drawing 10.3, the Project largely avoids several large, contiguous areas of modelled sensitive flora habitat in the Study Area and RAA.

Based on the current configuration of the Clearing Footprint, the Project is expected to have a moderate impact on flora SAR and SOCI. Interactions with rare flora have been reduced by incorporating the locations of flora SAR and SOCI into the layout of the Clearing Footprint where practicable, and modelling suggests that a low amount of potential habitat for sensitive flora species will be impacted by the Project and will remain abundant in the RAA following construction. Direct losses of rare flora and impacts to supporting habitat will be limited to the LAA and will primarily be associated with vegetation clearing within the Clearing Footprint. While any direct loss of individuals will be irreversible, impacts to supporting habitat may be partially reversed following decommissioning.

Indirect Effects

In addition to the direct impacts to vegetation communities and flora described above, vegetation clearing and land disturbance also have the potential for indirect impacts that extend beyond the Clearing Footprint. Indirect impacts to vegetation communities and flora may occur through habitat fragmentation and edge effects, dust deposition, and the introduction and spread of invasive species.

Habitat Fragmentation

On a per kilometer basis, wind energy projects tend to impact relatively low amounts of undisturbed habitat, but often cause high levels of habitat fragmentation due to the large road networks required to access turbines (Diffendorfer et al., 2019). Habitat fragmentation, defined as the conversion of continuous habitat into small and isolated patches (Meffe & Carroll, 1994) can have a variety of impacts on vegetation communities and flora, including changes in species composition, genetic diversity, and reproductive output (Aguilar et al., 2009; Brisson et al., 2010; Hulting et al., 2025).

The Project road network makes the largest overall contribution to the area of the Clearing Footprint and is expected to increase the baseline road density of the Study Area, with a total of 129 km of new roads planned (52% of the Clearing Footprint). The sensitivity of different groups of flora to road development is likely to vary based on factors such as seed dispersal ability, pollination requirements, and the population size of individual species. Large-seeded plants and species with animal-mediated dispersal may be more vulnerable to the impacts of habitat fragmentation than species with small, or wind-dispersed seeds that can move more effectively between patches of remnant habitat (Cramer et al., 2007). For example, species of trilliums such as nodding (*Trillium cernuum*) and painted trillium (*Trillidium undulatum*) observed during field surveys are primarily dispersed by ants, and with a dispersal range of about 1 m per year (Zettler et al., 2001), are highly sensitive to habitat fragmentation. Studies have also shown that habitat fragmentation can alter the movement of pollinators, resulting in reduced reproductive output for plant species that depend on insect pollination for seed production (Aguilar et al., 2009). Similarly, the status of rare flora species (including lichens) may be especially vulnerable to habitat isolation as species with small population sizes often already experience isolation between populations (US Forest Service, n.d.).

As described by Diffendorfer et al. (2019), new roads play a key role in determining the levels of habitat fragmentation created by wind energy projects. The greatest increases in road density, and therefore potential for fragmentation, will occur in the southeastern portion of the Study Area where few existing roads are present (Drawing 3.1A to 3.1Q). This area is dominated by open barrens and shrub-cover and was observed to support a lower diversity of rare flora and potential sensitive flora habitat compared to the north and west (Drawing 9.3A to 9.3Q and 10.3). Concentrating new road development in this area may therefore be less impactful to rare flora than placing equivalent roads in other undisturbed parts of the Study Area or RAA. In determining the infrastructure layout, the Project has prioritized the use of existing roads, such that 42% of the total road network (94 km) consists of roads that have been developed for other uses (primarily forest harvesting) and that will be upgraded and

reused for the Project. While fragmentation of terrestrial habitats is certain to occur, these factors have helped to reduce the overall impacts on vegetation communities and flora.

Edge Effects

In addition to the division and isolation of suitable habitat, fragmentation can also have a variety of edge effects on flora by creating abrupt transition zones between disturbed and intact areas. As outlined in Section 10.1.5, the Project will create new areas of edge habitat when intact forest is cleared during the site preparation and construction phase. The creation of edge habitat is known to cause changes in environmental conditions that extend beyond a disturbance footprint, including increased temperature and light availability and reductions in moisture and humidity (Braithwaite & Mallik, 2012; Hamberg et al., 2009). These abrupt environmental changes can impact the growth and survival of flora individuals adapted to interior forest conditions (Boudreault et al., 2008; Esseen & Renhorn, 1998) and can cause long-term changes in the composition and diversity of vegetation communities (Willmer et al., 2022).

It is estimated that a total of 358.5 ha of new edge habitat will be created in the LAA, with an additional 123.4 ha of interior forest directly impacted by the Clearing Footprint (Drawing 10.4A to 10.4F). Due to the linear nature of road infrastructure, most areas of new edge habitat will be associated with road development and upgrades to existing roads. Within the RAA, a total of 702.7 ha of existing edge habitat (i.e., due to forest harvesting within the last 10 years) and 9,870.5 ha of intact interior forest was identified. Overall, an estimated 5.9% of the LAA is expected to be indirectly impacted by edge effects, with areas of intact interior forest remaining abundant within the RAA following construction. Similar to habitat fragmentation, the degree to which vegetation communities and flora are impacted by edge effects varies depending on the species and specific site conditions.

Many types of lichens (e.g., cyanolichens, and fruticose and foliose lichens) require high humidity environments to support the growth of thalli, as lichens lack true roots and absorb water directly from the air/dew. Lichens are therefore known to be sensitive to edge effects that alter the microclimate of their supporting habitat (Boudreault et al., 2008; Nash, 2008). For example, Cameron et al. (2013) suggest that forest harvesting near occurrences of boreal felt lichen can impact the survival of individuals through increased solar radiation, wind, and temperature. Although field surveys primarily focused on direct interactions with the Project such that areas outside the Clearing Footprint were not consistently captured, two occurrences of frosted glass-whiskers, a lichen SAR associated with mature forest habitat (ECCC, 2011b), and an additional 10 occurrences of lichen SOCI coincide with areas of new edge habitat created by the Project.

The composition and diversity of plant communities also have potential to be impacted by the creation of edge habitat. For instance, following vegetation clearing, trees growing along new forest edges are often more vulnerable to natural disturbances such as windthrow (e.g., Esseen, 1994) due to being exposed to higher wind speeds that they are accustomed to. As described by Willmer et al. (2022), abrupt edges in temperate forests can also experience an

increase in the number of plant species due to edge effects. However, increases in diversity may be temporary as species adapted to interior forest conditions may be poor competitors with light-demanding species that frequently colonize forest edges (Gonzalez et al., 2010). Shade-adapted trees and herbaceous flowering plants were observed during field surveys, including American beech, eastern hemlock, white baneberry (*Actaea pachypoda*), and cucumber root (*Medeola virginiana*). Although edge dynamics are frequently complex and difficult to predict, it is likely that the composition of plant communities dominated by these and other shade tolerant species would shift following the creation of edge habitat.

The edge effects analysis suggests that a low amount of edge habitat will be created by the Project relative to the size of the Clearing Footprint. Literature suggests that flora species, particularly lichens and shade-adapted plants, that occur within new areas of edge habitat will experience changes in microclimate conditions that may alter the status of individuals and influence the long-term composition of vegetation communities. Edge effects will be limited to the LAA and will primarily be associated with road construction and upgrades to existing roads. In the context of the RAA, a low amount of intact forest is expected to be directly/indirectly impacted, and areas of intact interior forest will remain abundant in the RAA following construction. Though there is no threshold for identifying the duration of edge effects, the impacts can generally be expected to diminish over time (Alberta Environment and Parks, 2022) as infilling at forest edges reduces the depth of edge influence. Allowing for natural revegetation of areas that are temporarily cleared for construction and revegetation of the site during decommissioning will help to mitigate the impacts of edge effects.

Dust

Dust deposition may impact flora within or near the Clearing Footprint when fugitive dust is generated by road traffic on unpaved areas, crushing material, and blasting (if required for the Project). Vascular plants may be impacted by dust through reductions in photosynthesis and leaf diffusion (Thompson et al., 1984) as dust deposited on leaf surfaces can block stomata and reduce light absorption. Lichens can also be impacted by dust deposition due to their sensitivity to air quality. Dust from unpaved areas has been found to change the pH of lichen substrates (i.e., the tree bark they are attached to) and impact individual health and species richness (Degtjarenko, 2016).

The impacts of dust on flora species is influenced by duration of exposure and distance from the source of dust production. For instance, one study found that lichens along a gravel road were unaffected within two years, but significant changes to the communities were observed after 10 years (Farmer, 1993). The spread of fugitive dust is influenced by several factors, including the height at which the dust is released, wind conditions, and particle size. Under standard conditions, fugitive dust particles above 30 µm settle out within 100 m of the emission source. Other finer particles have a slower settling velocity and may travel further (US EPA, 1995).

It is expected that impacts to vegetation communities and flora relating to dust deposition will be greatest during the site preparation and construction phase (short-term duration) and will be

limited to the LAA. Site traffic will be greatly reduced during the operations and maintenance phase of the Project. Measures to mitigate the effects of dust in relation to air quality, which will also benefit flora species, are described in detail in Section 7.1.

Invasive Species

The development of wind energy projects has been identified as a pathway for the introduction and spread of non-native species due to the vegetation clearing and ground disturbance required to support the construction of road networks, turbines, and other project infrastructure, (Urziceanu et al., 2024). Non-native species, often introduced to a landscape accidentally by humans, can become invasive when they cause harm to the environment, economy, or human health through rapid reproduction and out-competing of native species (Rutledge et al., 2024). Invasive species are often adapted to soil disturbance and high light levels, such that they often proliferate along disturbed edges and other open areas (Harper et al., 2005). Several plant SAR that occur in Nova Scotia are known to be threatened by invasive species (NSNR, n.d.-a). Industrial projects can contribute to the spread of invasive species in several ways:

- Reduced resistance to invasion through soil disturbance and removal of native vegetation
- Increased access to remote areas with equipment carrying seeds, spores, or other reproductive materials from non-native species.
- Revegetation of cleared land with non-native seed mixes.

A total of 12 non-native plant species were observed during field surveys, including one species considered to be invasive in Nova Scotia (purple loosestrife). Research suggests that early detection and eradication can be effective in preventing the spread of invasive species in disturbed areas such as wind farms (Kumar Rai & Singh, 2020; Urziceanu et al., 2024). Given that non-native and invasive species are already known to be present, mitigations to limit the introduction and spread of these and other non-native species within the LAA are provided.

Mitigation Measures

To minimize the effects of the Project on terrestrial vegetation communities and flora, the following mitigation measures will be implemented:

Loss of Sensitive Vegetation Communities

- Minimize overall area to be altered by maximizing the use of previously disturbed areas (i.e., clearcuts and use of existing roads), where practicable.
- Allow for natural revegetation wherever practicable to promote continued growth of terrestrial vegetation communities and flora.
- Avoid disturbance to sensitive features identified during desktop and field assessment (e.g., wetlands and old-growth forests) by micro-siting, where practicable, including any new observations encountered while surveying the areas to be assessed later (Drawing 4.1). Should avoidance not be possible, engage with NSECC and/or NSNR, as appropriate during the permitting process.

Loss of Flora SAR or SOCI and Impacts on Supporting Habitat

- Continue to avoid flora SAR and minimize interactions with supporting habitat during the detailed design phase, including any new observations encountered while surveying the areas to be assessed later (Drawing 4.1). Should avoidance not be possible, engage with NSNR, as appropriate during the permitting process.
- Consult with NSNR and NSECC if unexpected flora SAR are encountered during construction activities.
- Develop and implement an Erosion and Sediment Control Plan.

Indirect Effects

- Minimize the development of new linear features through compact design of the Project layout.
- Implement speed limits to reduce dust emissions.
- Use dust suppressants (e.g., water trucks) when required.
- Ensure equipment is cleaned periodically to prevent the introduction and/or spread of non-native species.

Monitoring

No monitoring programs specific to terrestrial vegetation communities and flora are proposed.

Conclusion

The predicted residual effects of the Project on terrestrial vegetation communities and flora (after mitigation) are characterized in Table 10.9.

Table 10.9: Terrestrial Vegetation Communities and Flora Residual Effects

Effect Detail	Loss of Sensitive Vegetation Communities	Loss of Flora SAR or SOCI and Impacts on Supporting Habitat	Indirect Effects on Vegetation Communities and Flora
Magnitude of Effect	Low: Small loss of sensitive vegetation communities	Moderate: Small loss of or effects on terrestrial flora SAR and SOCI individuals (and associated habitat) that do not have legislated protection status, but their populations remain largely intact	Low: Low impacts to sensitive vegetation communities and flora SAR and SOCI due to indirect effects
Geographic Extent of Effect	100 m buffer of the Clearing Footprint	100 m buffer of the Clearing Footprint	100 m buffer of the Clearing Footprint
Frequency of Effect	Single Event: Effects may occur during initial site preparation and construction	Single Event: Effects may occur during initial site preparation and construction	Intermittent: Effects may occur throughout all Project phases
Duration of Effects	Medium Term: Effects will end following decommissioning	Medium Term: Effects will end following decommissioning	Medium Term: Effects will end following decommissioning

Effect Detail	Loss of Sensitive Vegetation Communities	Loss of Flora SAR or SOCI and Impacts on Supporting Habitat	Indirect Effects on Vegetation Communities and Flora
Reversibility of Effect	Partially Reversible	Partially Reversible	Partially Reversible
Significance Level	Not Significant	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible			

10.2 Terrestrial Fauna

10.2.1 Overview

The terrestrial fauna assessment was completed using a combination of desktop and field assessments to achieve the following objectives:

- Identify significant species and habitat supporting SAR and SOCI within/near the Study Area using desktop resources.
- Determine the likelihood of SAR and SOCI occurring in the Study Area.
- Use data from targeted surveys as well as incidental observations for different groups of terrestrial fauna to document the presence of species within the Study Area, particularly SAR and SOCI.
- Use the information collected through field studies to update the Project design, as necessary, to avoid or minimize interactions between Project infrastructure and confirmed locations of terrestrial fauna SAR and SOCI or the habitats that are known to support terrestrial fauna SAR or SOCI.
- Apply mitigation, construction, and operational management practices to minimize effects to terrestrial fauna.

10.2.2 Regulatory Context

Several laws and regulations provide protection for terrestrial fauna (i.e., mammals, herpetofauna, and invertebrates) and their habitats in Nova Scotia:

- *Species At Risk Act* (Canada, 2002)
- *Canadian Environmental Protection Act* [CEPA, (Canada, 1999)]
- *Canada Wildlife Act* (Canada, 2000)
- *Endangered Species Act* (Nova Scotia, 1998)
- *Wildlife Act* (Nova Scotia, 1989)
- *Biodiversity Act* (Nova Scotia, 2021)
- *Environment Act* (Nova Scotia, 1995b)

ESA and SARA prohibit harm to SAR listed as Endangered or Threatened along with their habitually occupied spaces and core/critical habitat. The *Canada Wildlife Act* (Canada, 2000) provides a framework for the creation of protected wildlife areas, and the *Wildlife Act* (Nova Scotia, 1989) provides policies and programs for wildlife to maintain diversity of species at levels of abundance to meet specific management objectives. The *Wildlife Act* (Nova Scotia, 1989) includes a clause for the protection of den/habitation of a furbearer [48(3)] and prohibits harm to the nest of a (bird or) turtle [51(a)]. The *Biodiversity Act* (Nova Scotia, 2021) provides a framework for the creation of Biodiversity Management Zones used for conservation and sustainable biodiversity values. Lastly, CEPA and the *Environment Act* (Nova Scotia, 1995b) both provide measures for the protection of the environment and pollution prevention.

10.2.3 Desktop Review

Prior to undertaking the terrestrial field assessment, a detailed desktop review of known fauna observations and potential habitat for terrestrial fauna was completed to support the survey design. The following databases were reviewed:

- ACCDC Report (ACCDC, 2025b)
- NSNR Significant Species and Habitat Database
- Provincial Forest Inventory Database (NSNR, 2021j)
- Provincial Roads and Railroads Database (GeoNOVA, 2024c)
- Provincial Secondary Watershed Boundaries (NSECC, 2011b)
- Provincial WAM Database (NSECC, 2022c)
- SARA and ESA Recovery Strategies
- Special Management Practice (SMP) Layers

During the desktop review, emphasis was placed on information recorded within 5 km of the Study Area, as this distance captures observational records and mapped habitat that are of high relevance to the Project.

Mammals

The ACCDC data report (2026a) indicates that one terrestrial mammal SAR, mainland moose (ESA Endangered, S-Rank S1) has been recorded with within 5 km of the Study Area (excluding aquatic mammals, bats, and birds; see Sections 9.1, 10.3, and 10.4, respectively). Mainland moose is a location sensitive species in Nova Scotia, and confirmation that the Study Area is within core habitat and that species occurrences have been previously observed within and near the Study Area was provided by NSNR (SAR Biologist, S. Spencer, March 23, 2026). No records associated with other mammal SAR or SOCI were identified within 5 km of the Study Area. The complete ACCDC data report for the Project, which includes records of terrestrial fauna within 100 km of the Study Area, is provided in Appendix H.

The NSNR Significant Species and Habitat Database available on the Provincial Landscape Viewer (NSNR, 2024d) indicates that two wintering areas for white-tailed deer coincide with the Study Area, and that two additional wintering areas are within 5 km of the Study Area boundary (Drawing 10.2).

Mainland Moose Habitat Suitability Modelling

Mainland moose habitat suitability modelling was conducted by Strum based on methodology established in the Mainland Moose Recovery Plan (NSNR, 2021j). Modelling was completed using the following data sources:

- Provincial Forest Inventory Database (NSNR, 2021j)
- Provincial Roads and Railroads Database (GeoNOVA, 2024c)
- Provincial WAM Database (NSECC, 2022c)

The data contained within the forest inventory database was reclassified for the purposes of this analysis based on land cover types (e.g., forest types, management history, and wet areas) to determine suitability for the different habitat needs of mainland moose. Wetland environments were a required component in the creation of this model as mainland moose use wetlands for thermal refuge in summer, and aquatic plants such as pondweed (*Potamogeton spp.*) and yellow pond lily (*Nuphar lutea*) provide important nutritional foraging options. Wetlands, particularly isolated areas surrounded by water, are also important calving areas as they provide protection and nutrients for calves and cows. For the purposes of the model, wetlands were determined from the wet areas database which was used to find areas where the depth to water of 50 cm or less, indicating a high probability of wet conditions favourable to mainland moose.

Land was classified based on its suitability for the various requirements of mainland moose to establish favourable attributes for habitat suitability. Habitat types assessed through land cover and landscape features which are counted in a positive criteria layer include:

- Summer forage
- Summer cover
- Winter forage
- Winter cover
- Calving areas

For more information on the criteria and characteristics of the above habitat types, refer to the Recovery Plan for the Moose in Mainland Nova Scotia (NSNR, 2021j), Section 8.2 Attributes of Core Habitat. From the above datasets, features that detract from suitability of mainland moose habitat are incorporated into a negative criteria layer to include:

- Urban areas
- Landfill
- Quarry
- Road density
- Harvested areas

Using the Raster Calculator in ArcGIS Pro, the negative criteria raster's values were subtracted from positive criteria raster values to determine the overall suitability of habitat for mainland

moose. To allow for some generalization of habitat areas, zonal statistics were calculated based on 5 ha hexagons. A grid of hexagons was generated as a Habitat Suitability Score which ranges from -3 to 5 (the lowest and highest possible scores), in which -3 is highly unsuitable, and 5 is ideal mainland moose habitat. For descriptive purposes, this range is divided into discrete bins that describe habitat suitability on a scale from poor to best (Drawing 10.6; Table 10.10).

Based on habitat suitability score, any area classified as at least “fair” provides at least one habitat type requirement for the mainland moose. Habitat designated as “best” is providing multiple habitat types for the species while being minimally impacted by negative factors such as roads or conflicting land-uses. Note that scores greater than 4.01, while mathematically possible, are ecologically infeasible due to the unique characteristics of different mainland moose habitat types.

Table 10.10: Mainland Moose Habitat Suitability Model Weighting Scheme

Habitat Suitability Score Range	Habitat Suitability Category	Clearing Footprint		Study Area		5 km of the Study Area ⁽¹⁾	
		ha	%	ha	%	ha	%
< 0	Poor	418.6	24.4	5,133.0	23.3	17,952.6	23.6
0	Neutral	675.6	39.4	7,839.9	35.5	18,120.9	23.8
0 to 1.35	Fair	571.5	33.3	8,460.1	38.4	22,076.7	29.0
1.36 to 2.68	Better	50.4	2.9	590.0	2.7	2,586.4	3.4
2.69 to 4.01	Best	0.0	0.0	33.0	0.1	209.9	0.3
Total		1,716.1	100.0	22,055.9	100.0	60,946.5 ⁽¹⁾	100.0

⁽¹⁾This area includes only mainland Nova Scotia (ocean and offshore islands excluded), and also represents the LAA for terrestrial fauna, as described in Section 10.2.5.

The habitat suitability map indicates that the Study Area primarily consists of “fair” (38.4%) and “neutral” (35.5%) habitat for mainland moose (Drawing 10.6). On a proportional basis, the extent of suitable habitat in the Clearing Footprint, Study Area, and surrounding 5 km is highly comparable. Across all three spatial boundaries, there is a low amount of habitat in the “better” and “best” categories, with no areas of classified as “best” in the Clearing Footprint. During the modelling exercise, the low overall suitability of habitat within the Study Area was observed to be driven by a limited amount of forest cover in the southeastern portion of the Study Area, the fragmented nature of forest stands in the north and west, and the presence of existing roads along coastal areas. The largest contiguous area of suitable habitat within the Study Area occurs along Bass Brook in the central portion of the Study Area. Much of this land coincides with a forest stand protected under the Old-Growth Forest Policy (NSNR, 2022a).

Herpetofauna

Data from the ACCDC report (2026a) indicates that no herpetofauna SAR or SOCI have been recorded within the Study Area, and one herpetofauna SAR and one herpetofauna SOCI have been recorded within 5 km of the Study Area boundary (Table 10.11; Drawing 10.2). Wood turtles, a herpetofauna SAR, are a location sensitive species, and confirmation that the nearest

species occurrence is approximately 4 km from the Study Area boundary was provided by NSNR (SAR Biologist S. Spencer, March 23, 2026). An occurrence record of four-toed salamander (*Hemidactylium scutatum*), a SOCI, is approximately 400 m outside of the Study Area boundary.

Table 10.11: ACCDC Herpetofauna Records within 5 km of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Four-toed Salamander	<i>Hemidactylium scutatum</i>	-	-	-	S3
Wood Turtle	<i>Glyptemys insculpta</i>	Threatened	Threatened	Threatened	S2

Source: (ACCDC, 2026a)

A wood turtle SMP layer provided to Strum by NSNR (NSNR, 2012b) indicates that two watercourses known to support wood turtles are present near the Study Area. The 200 m SMP buffer around one of these watercourses and its associated secondary watershed (NSECC, 2011b) overlap a small portion of the Study Area. The Significant Species and Habitat Database (NSNR, 2024d) also contains several features associated with wood turtles within 5 km of the Study Area.

Invertebrates

The ACCDC data report (2026a) contains records of one invertebrate SAR and two invertebrate SOCI within 5 km of the Study Area (Table 10.12; Drawing 10.2). Of these, one record of question mark butterfly (*Polygonia interrogationis*; S-Rank S3B), a SOCI, is in the Study Area. The nearest record of monarch (*Danaus plexippus*; SARA and ESA Endangered, S-Rank S2?B,S3M), an invertebrate SAR, is approximately 30 m south of the Study Area near New Harbour.

Table 10.12: ACCDC Terrestrial Invertebrate Records within 5 km of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Laurel Sphinx Moth	<i>Sphinx kalmiae</i>	---	---	---	S3S4
Monarch	<i>Danaus plexippus</i>	Endangered	Endangered	Endangered	S2?B, S3M
Question Mark	<i>Polygonia interrogationis</i>	---	---	---	S3B

Source: (ACCDC, 2026a)

There are no Significant Species and Habitat Database Polygons on the Provincial Landscape Viewer (NSNR, 2024c) relevant to invertebrates within 5 km of the Study Area.

10.2.4 Field Assessment

10.2.4.1 *Field Assessment Methodology*

Mammals

Two rounds of winter tracking surveys and one round of pellet surveys were conducted in 2024 across 16 transects (approximately 21 km) to assess the presence and distribution of mainland moose and other mammals across the Study Area. Seven trail cameras were also deployed from March 2023 to May 2024 to capture the presence of wildlife without interference from

humans (Table 10.13; Drawing 10.7). The goal of the surveys was to provide a broad perspective of terrestrial mammal activity in the Study Area by covering all relevant habitat types, including roadways, wetlands, various forested habitats, riparian areas along watercourses and waterbodies, and previously disturbed areas (e.g., clearcuts). Incidental observations of terrestrial mammals made during other survey types were also recorded.

Table 10.13: Mammal Assessment Survey Information

Survey Type	Transect/ Trail Camera ID	Dates Completed/Deployed	Transect Length (km)
Winter Tracking	WT-T1	Round 1: January 8, 2024 Round 2: February 20, 2024	1.0
	WT-T2	Round 1: January 16, 2024 Round 2: March 13, 2024	1.4
	WT-T3	Round 1: January 16, 2024 Round 2: March 13, 2024	1.8
	WT-4	Round 1: January 9, 2024 Round 2: March 13, 2023	1.9
	WT-5	Round 1: January 23, 2024 Round 2: March 14, 2024	1.0
	WT-6	Round 1: January 9, 2024 Round 2: March 13, 2024	1.6
	WT-7	Round 1: January 16, 2024 Round 2: March 14, 2024	1.1
	WT-8	Round 1: January 9, 2024 Round 2: March 14, 2024	1.2
	WT-9	Round 1: January 16, 2024 Round 2: March 13, 2024	1.0
	WT-10	Round 1: January 16, 2024 Round 2: March 14, 2024	1.6
	WT-11	Round 1: January 1, 2024 Round 2: February 21, 2024	0.6
	WT-12	Round 1: January 9, 2024 Round 2: February 21, 2024	1.4
	WT-13	Round 1: January 9, 2024 Round 2: February 21, 2024	0.9
	WT-14	Round 1: January 31, 2024 Round 2: February 22, 2024	1.1
	WT-15	Round 1: January 8, 2024 Round 2: February 22, 2024	1.2
	WT-16	Round 1: January 9, 2024 Round 2: February 20, 2024	2.1
Pellet Surveys	PGI-T1	April 11, 2024	1.7
	PGI-T2	April 11, 2024	1.9
	PGI-T3	April 11, 2024	1.3

Survey Type	Transect/ Trail Camera ID	Dates Completed/Deployed	Transect Length (km)
	PGI-T4	April 11, 2024	1.4
	PGI-T5	April 11, 2024	1.5
	PGI-T6	April 11, 2024	1.9
	PGI-T7	April 11, 2024	1.2
	PGI-T8	April 11, 2024	1.4
	PGI-T9	April 18, 2024	1.4
	PGI-T10	April 18, 2024	1.4
	PGI-T11	April 25, 2024	1.6
	PGI-T12	April 24, 2024	1.0
	PGI-T13	April 17, 2024	1.0
	PGI-T14	April 17, 2024	1.2
	PGI-T15	April 11, 2024	1.0
	PGI-T16	April 11, 2024	0.9
Trail Cameras	TC-54	March 2023 to May 2024	N/A
	TC-58	March 2023 to February 2024	N/A
	TC-73	March 2023 to May 2024	N/A
	TC-76	March 2023 to May 2024	N/A
	TC-77	March 2023 to May 2024	N/A
	TC-82	March 2023 to May 2024	N/A
	TC-83	March 2023 to May 2024	N/A

The methods used for winter tracking and pellet surveys were adapted from recommendations provided by NSNR Wildlife Division (NSNR, 2022c). Winter wildlife tracking surveys were completed over two rounds from January to March 2024. As recent, intact, tracks in fresh snow allow for the most accurate track identification, winter tracking surveys were completed within five days of snowfall of 10 cm or more. This timeline allowed sufficient time for animals to leave their tracks, and limited opportunities for tracks to deteriorate or disappear because of excessive snowfall, melting, wind, or rain. Care was also taken to ensure surveys were not completed during rain or snow events. One round of pellet surveys was completed in April 2024 after snow had melted completely, revealing animal droppings that had been preserved in the snow over the winter.

Winter tracking and pellet surveys were conducted along pre-determined transects (16 in winter, 16 in spring) covering a range of representative habitats within the Study Area, with priority given to habitat where mainland moose were expected to be active during the winter, if present (Drawing 10.7). Transects ranged from 0.6 km to 2.1 km in length. In some cases, transect lengths and locations were altered between winter tracking and pellet surveys to account for information gained during winter tracking to ensure as many habitat types as possible could be covered across surveys, and to maximize coverage across the Study Area.

Sections of trails and roads were also surveyed opportunistically, and any observations of interest were recorded. All survey tracks were recorded using ArcGIS Field Maps, and any changes to transects were made such that the new course was similar in length to the planned transect and covered similar or improved habitat types.

Transects were travelled by foot during both survey types. While slowly travelling along a transect, an approximately 4 m area centered on the transect line was scanned for any sign of animal activity, including tracks, pellets/scat, browse, dens, or animal sightings. When suspected activity from white-tailed deer and any terrestrial mammal SAR or SOCI, including mainland moose, was observed, detailed notes and photos relating to habitat and animal sign were recorded. Additional observations of interest, such as evidence of predator and prey interactions, were also recorded. Any other activity from non-SAR or SOCI mammals was recorded only if the observation was found to be particularly unusual or interesting. All observations were recorded and georeferenced in the field using an ArcGIS Survey123 form. Upon completion of each transect, a general description of the transect including overall tracking conditions, different habitats encountered, and abundance of each species was recorded. Abundance of each species includes all SAR and SOCI and non-SAR and SOCI mammals. If observations of terrestrial mammal SAR or SOCI activity were made during other survey types (i.e., wetland assessments), these observations were also recorded.

Concurrently, and in addition to wildlife surveys, seven trail cameras were deployed at seven locations across the Study Area from March 2023 to May 2024 (Drawing 10.7). Locations were selected to include various habitat types, and to capture more information from locations previously found to have signs of wildlife. Large mammals commonly use old roads, trails, or natural corridors such as riparian zones to travel throughout a landscape, and thus cameras were placed in these areas to capture their movements. Trail cameras were visited regularly to replace storage cards and batteries, and occasionally the trail camera itself was removed from one location and relocated to increase site coverage. All photos were then assessed for signs of wildlife.

Herpetofauna

A desktop review of the Study Area was undertaken before conducting field surveys to identify areas of preferred turtle habitat. According to their Recovery Strategy, wood turtles require water with sufficient flow and sufficient depth to provide them with ice-free, well-oxygenated water throughout the winter (ECCC, 2020b). Wood turtles tend to hibernate wherever instream structures such as boulders or root-wads provide some cover and rarely hibernate outside of the main channel of a watercourse, as they require well oxygenated water throughout the winter (pers. comm., M. Pulsifer, January 2021).

Wood turtles nest in well-drained gravelly soil on the banks of inhabited watercourses. While some may be attracted to gravelly roadsides for nesting, this habitat is considered unsuitable due to the danger presented to emerging hatchlings. To support egg incubation, soils need to be well-drained, with a southern aspect, and free of vegetation. This habitat is typically present as sand or gravel bars in depositional areas of dynamic, natural watercourses (ECCC, 2020b).

With limited overlap between the Study Area and secondary watersheds known to support wood turtles, surveys were conducted throughout the Study Area in watercourses with potential to serve as wood turtle habitat selected through a desktop review. Generally, transects were established to target clear, meandering watercourses with a moderate flow, sandy or sand-gravel areas, and artificial nesting sites which may include gravel pits, road shoulders, and residential sites. The suitability of habitat surrounding watercourses (including riparian or forested areas, or open areas such as flood plains, meadows, river oxbows, and beaver ponds) was also considered when selecting transect locations.

Targeted wood turtle surveys were completed in May 2023 along eight pre-determined watercourse transects ranging from 415 m to 500 m in length (Drawing 10.7). Transects were surveyed simultaneously by two field biologists walking on each side of the watercourse while scanning the ground, the banks, and the water. Search efforts focused on bank areas with high sun exposure or other adequate basking areas such as instream rocks or logs. Wood turtles may occur under or near deadfall, grasses, leaf litter, or woody shrubs (particularly alder trees) where they are more inconspicuous, and these areas were therefore searched with greater intensity. All survey tracks were recorded using handheld global positioning system (GPS) units, and any changes to transects were made such that the new course was similar in length to the planned transect and covered similar or improved habitat types. One survey round was completed.

Any observations of turtles, snakes, or salamanders were recorded and georeferenced in the field using an ArcGIS Survey123 form. Upon completion of each transect, a general description of the transect, including the presence of any notable habitat features, was recorded. Any additional observations of herpetofauna made during other survey types such as wetland or watercourse surveys, as well as observations of suitable wood turtle habitat, were also recorded.

Invertebrates

Targeted surveys for invertebrate species were not completed; however, any incidental observations of invertebrate SAR or SOCI during other field surveys were documented, if observed. Obligate habitats for invertebrate SAR were recorded if observed incidentally or through botany surveys – specifically referring to observations of milkweed (*Asclepias* spp.) as an obligatory food source and breeding habitat for the monarch butterfly.

10.2.4.2 Field Assessment Results

Mammals

Signs or observations of 10 mammal species (as well as signs of unidentified rodents) were identified in the Study Area during targeted surveys and/or incidental observations (Table 10.14; photograph log included in Appendix M). Of the mammals observed, one species, mainland moose, is a SAR (no mammal SOCI observed). During pellet inventory surveys, signs of white-tailed deer were common, with the number of piles of white-tailed deer pellets ranging from no piles (PGI-T14 and PGI-T16) to 13 piles per transect (PGI-T10 and PGI-T11), with an average of five piles per transect.

Table 10.14: Results Summary of the Mammal Field Assessments

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
American Black Bear	<i>Ursus americanus</i>	-	-	-	S5
North American Porcupine	<i>Erethizon dorsatum</i>	-	-	-	S5
Bobcat	<i>Lynx rufus</i>	-	-	-	S5
Eastern coyote	<i>Canis latrans</i>	-	-	-	S5
Mainland moose	<i>Acles alces americanus</i>	-	-	Endangered	S1
North American beaver	<i>Castor canadensis</i>	-	-	-	S5
Red Fox	<i>Vulpes vulpes</i>	-	-	-	S5
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	-	-	-	S5
Snowshoe Hare	<i>Lepus americanus</i>	-	-	-	S5
Unidentified rodent	N/A	N/A	N/A	N/A	N/A
White-tailed Deer	<i>Odocoileus virginianus</i>	-	-	-	S5

Source: (ACCDC, 2026b)

One mammal species, white-tailed deer, was recorded by trail cameras (Table 10.15, photograph log provided in Appendix M). The highest level of white-tailed deer activity was recorded at TC-73, where 47 observations of the species were recorded. This trail camera was located next to a watercourse in a forested area near two lakes (Drawing 10.7).

Table 10.15: Summary of Trail Camera Results

Trail Camera	Mammals Observed	Number of Observations ⁽¹⁾
TC-54	-	-
TC-58	-	-
TC-73	White-tailed Deer	47
TC-76	-	-
TC-77	-	-
TC-82	White-tailed Deer	5
TC-83	White-tailed Deer	4

⁽¹⁾Number of observations adjusted based on likelihood of photos belonging to the same animal; a general rule of one hour between photos was applied to consider photos of the same species to be separate observations.

Herpetofauna

No direct observations or signs of wood turtles (e.g., nests, eggs, shell fragments) or other herpetofauna were recorded during targeted wood turtle surveys. Transects in several of the surveyed watercourses (WCT-1, WCT-2, WCT-3, and WCT-7) had suitable habitat characteristics for wood turtles, such as moving water with deep pools, scalable banks, basking areas, and/or gravel areas. Potential nesting habitat was observed at WCT-3, and potential overwintering habitat at WCT-1, WCT-3, and WCT-7 (Table 10.16). The remaining transects (WCT-4, WCT-5, WCT-6, and WCT-8) were determined to have low suitability for wood turtles due to shorelines being dominated by dense tree or shrub cover or having boulder/muck substrate.

Table 10.16: Habitat Descriptions of Wood Turtle Survey Transects

Transect	Description of Habitat	Potential Wood Turtle Habitat		
		General	Nesting	Overwintering
WCT-01	Slow moving water with deep pools, dirt/sphagnum substrate present.	Y	N	Y
WCT-02	Substrate composed of cobbles to boulders, shallow scalable banks with pools present.	N	N	Y
WCT-03	Gravel areas present with some scalable banks.	N	Y	Y
WCT-04	Mucky substrate with shrub-dominated shorelines. Few gravel shores or logs for basking.	N	N	N
WCT-05	Substrate dominated by boulders with dense shrubs along shoreline.	N	N	N
WCT-06	Watercourse and banks overgrown by shrubs.	N	N	N
WCT-07	Slow moving, deep water with abundant basking areas (logs, rocks, etc.). Scalable banks.	Y	N	Y
WCT-08	Shorelines dominated by trees and shrubs.	N	N	N

Several incidental observations of common herpetofauna species were recorded during field assessments: green frog (*Lithobates clamitans*; S-Rank S5), American bullfrog (*Lithobates catesbeianus*; S-Rank S5), pickerel frog (*Lithobates palustris*; S-Rank S5), and common garter snake (*Thamnophis sirtalis*; S-Rank S5) (Drawing 9.3A to 9.3Q).

Invertebrates

There were no observations of invertebrate SAR or SOCI recorded during field assessments. However, swamp milkweed (*Asclepias incarnata*, S-Rank S4), a vascular plant species that supports the monarch butterfly (SARA and ESA Endangered, S-Rank S2?B,S3M) was identified during flora surveys completed for the Project indicating suitable habitat is available in the Study Area (the specific location of the species occurrence is not available).

Priority Species

Based on the desktop review and field survey results, terrestrial species that have been recorded or are likely to occur within the Study Area were screened against the criteria outlined in the Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009) to develop a list of priority species, as detailed in the sections that follow.

Mainland Moose

Mainland moose are a SAR listed as Endangered under ESA with a subnational ranking of S1 (highest priority). They are not listed under SARA. Threats to mainland moose include habitat loss and fragmentation, particularly resulting from industrial activities; and loss of habitat

connectivity due to the increased placement and density of roads (NSNR, 2021j). Portions of the Study Area have previously been and continue to be subject to the abovementioned threats as a result of historical and current land-uses, including forestry activities and recreation (particularly the northern and western portions of the Study Area). Renewable energy projects are described in the Mainland Moose Recovery Plan (2021j) as a medium level threat to the species, as the nature of wind projects usually requires the construction or expansion of road networks and loss of forested habitat.

No evidence of mainland moose was observed during winter tracking or pellet inventory surveys or captured by trail cameras; however, mainland moose tracks were observed in three locations during fieldwork associated with trail camera deployment in February and March 2023, and in one location during wetland delineations in October 2024. All tracks were observed along existing roadways. Images of mainland moose tracks are provided in Appendix M, and the associated location details will be provided directly to regulators.

Wood Turtle

Wood turtles are a SAR listed as Threatened under SARA and ESA with an S-Rank of S2. Wood turtles are a habitat generalist but are associated with perennially flowing watercourses within forested habitat and require specific conditions for nesting (gravel beaches or bars) and overwintering (pools). The most significant threats to the species include road development and land use practices (NSNR, 2020c). Core and critical habitat has been identified for wood turtles in Nova Scotia (NSNR, 2020c), and SMPs have been established that include recommendations for activity and development limitations in the area (up to 200 m) surrounding watercourses where wood turtles are known to occur (NSNR, 2020c).

Areas of suitable nesting, overwintering, and general habitat were identified during targeted wood turtle surveys, and secondary watershed known to contain wood turtle SMP watercourses intersects with the Study Area. No occurrences or signs of wood turtles were recorded during targeted or non-targeted field surveys within or near the Study Area.

Monarch

The monarch (SARA and ESA Endangered, S-Rank S2?B, S3M) is a distinctive butterfly species that is native to North, Central, and South America. The eastern population, which occurs in Nova Scotia, has a large breeding range that extends from the Gulf of Mexico in the United States to southern Canada (including Nova Scotia) (ECCC, 2016a). During winter, the species migrates south to overwintering sites before breeding and northward migration begins again in the spring. Due to their complex life cycles, overwintering habitat requirements, and large breeding range, the species faces a variety of threats across its geographic range that have led to population-level declines. The most severe threats to the species include degradation and loss of overwintering habitat in Mexico and the southern United States, and the extensive use of herbicides throughout the species' breeding range (ECCC, 2016a). In Nova Scotia, conservation measures are primarily focused on maintaining the province's population of swamp milkweed to ensure sufficient habitat is available to support breeding populations (NSNR, 2021g). Monarchs almost exclusively lay their eggs on milkweed plants,

which are also an obligatory food source for larvae, and declines in the distribution and abundance milkweed pose a threat to the species.

No direct observations of monarch butterflies were recording during field assessments; however, species occurrence records were identified near the Study Area in the desktop review, and swamp milkweed was identified in the Study Area during flora surveys. This suggests that monarchs have potential to use areas of suitable habitat in the Study Area.

10.2.5 Effects Assessment

Project-Terrestrial Fauna Interactions

Project activities, primarily those that involve earth moving or vegetation removal, have the potential to impact terrestrial fauna (Table 10.17).

Table 10.17: Potential Project-Terrestrial Fauna Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for terrestrial fauna includes a 5 km buffer of the Study Area, including only the contiguous mainland (Drawing 10.5). This distance was selected based on the home ranges and short distance migrations of species between habitat types. The RAA is the boundaries of ecoregions that interest the Study Area, bounded by mainland Nova Scotia and the St. Mary's River. This area was selected to support the assessment of cumulative effects (Section 16.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for terrestrial fauna. The VC-specific definition for magnitude is as follows:

- Negligible: No loss or fragmentation of fauna habitat or impact to fauna through sensory disturbance or injury/mortality.
- Low: Small loss or fragmentation of habitat supporting fauna and low impacts to fauna through sensory disturbance or injury/mortality.
- Moderate: Moderate loss or fragmentation of fauna habitat and/or moderate impacts to fauna through sensory disturbance or injury/mortality, but these impacts will only be experienced by individuals rather than entire populations.
- High: High loss or fragmentation of fauna habitat or high impact to fauna through sensory disturbance or injury/mortality that would impact fauna on a population scale.

Effects

Project activities have the potential to impact terrestrial fauna through:

- Habitat loss and fragmentation
- Sensory disturbance
- Injury or mortality

Habitat Loss and Fragmentation

The Study Area and LAA are dominated by open areas, softwood forests, and cutover uplands, with areas of intact mature forest and an abundance of wetlands (described further in Section 10.1). These and other less common cover types are known to support a variety of fauna species, such that there is potential for terrestrial fauna habitat to be lost or fragmented due to vegetation clearing and ground disturbance required for the Project. As described in Section 10.1, many areas of intact forest in the LAA have already been disturbed and fragmented by forest harvesting and associated access roads and trails (e.g., cutover uplands, cutover wetlands, and urban/developed areas make up 18.6% of the LAA and 20.6% of the Clearing Footprint). A total of 123.4 ha of intact interior forest, which is an important habitat type for many fauna species (OMNR, 2000), is expected to be directly impacted by the Project, with an additional 358.5 ha of new edge habitat likely to be created. Incorporating important habitat features into the layout of wind energy projects has been identified as an strategy for mitigating impacts on terrestrial fauna (Katzner et al., 2025). To the extent practicable, the Project has prioritized the re-use of recently disturbed areas and minimized impacts to sensitive habitats such as mature forests, wetlands, and watercourses (i.e., areas regularly frequented by terrestrial fauna) which will help to reduce the overall impacts of the Project on the quality and abundance of fauna habitat.

Species of terrestrial fauna may respond differently to the impacts of habitat loss and fragmentation. For example, generalist species recorded during field assessments, such as black bear, eastern coyote, red fox, and white-tailed deer, tend to be more adaptable to altered conditions and the creation of edge habitats or open corridors (e.g., due to abundant prey,

foraging opportunities, and ease of movement) than species with specific habitat requirements. In contrast, the effects of habitat fragmentation may be particularly impactful for small mammals and herpetofauna that have difficulty accessing alternative areas of suitable habitat (Colino-Rabanal & Lizana, 2012; OMNR, 2000), and for large ungulates such as moose that are sensitive to landscape connectivity (NSNR, 2021j).

The potential impacts of the Project on the habitat of priority fauna species are described in the following sections.

Mainland Moose

The Study Area is located within core habitat identified in the Mainland Moose Recovery Plan for the Pictou/Antigonish/Guysborough subgroup of mainland moose (NSNR, 2021j) (though not legislatively protected under Section 16 or 18 of ESA). Within core habitat, areas are ranked as having high or low suitability based on a combined habitat suitability index (HSI) and road density score. Scores of 4 to 9 meet the suitability requirements (with higher scores reflecting higher suitability), and scores of three or below do not. The vast majority of the Study Area does not have an associated HSI/road density score, indicating low overall suitability. The northern portion of the Study Area coincides with core habitat areas with an HSI/roads criteria value of 4 to 6 that extends in to the LAA, as shown in Figure 5 of the Mainland Moose Recovery Plan (NSNR, 2021j). The dominant infrastructure planned for this area includes upgrades to existing roads, with a low proportion of turbines and new roads planned in this area.

Habitat loss and fragmentation have been identified as keys threats to mainland moose (NSNR, 2021j). Habitat loss and reduced habitat quality may result in behavioural changes, including from reduced opportunities for thermoregulation, loss of overwintering areas, loss of adequate sources of food, reduced space for mating, and reduced protection for calves. The habitat suitability model for mainland moose developed as part of the desktop review (described in Section 10.2.3) provides a spatially explicit reference for quantifying the impacts of the Project on suitable moose habitat. In line with mapping in the Mainland Moose Recovery Plan (NSNR, 2021j), the habitat suitability model suggests that the Clearing Footprint primarily consists of areas with “neutral” or lower suitability for mainland moose (571.5 ha, 33.3% of the total Clearing Footprint), with 50.4 ha (2.9%) of “better” habitat expected to be cleared for the Project (no planned loss of habitat in the “best” category). The amount of suitable habitat (habitat ranked “better” or “best”) within the Clearing Footprint represents 1.8% of the 2,796.3 ha modelled within the LAA, suggesting that the amount suitable habitat to be cleared for the Project is low. Importantly, most areas of contiguous suitable habitat in the Study Area and directly to the north have been avoided by the Project (Drawing 10.6).

On a broad scale, habitat fragmentation is a major concern for the longevity of mainland moose, as the species is already highly localized to three areas of the province (NSNR, 2021j). Road placement and density are the main drivers of reduced habitat connectivity, and road construction is defined as one of the main activities likely to result in destruction of important moose habitat (NSNR, 2021j). Road density values above 0.6 km/km² have been shown to

impact habitat selection by moose due to relationship between road density and habitat loss and fragmentation, as well as impacts from human activity (Beazley et al., 2004). Access roads, forestry trails, as well as more heavily trafficked roads are fairly abundant in the north and west of the Study Area, indicating that these areas are already likely subject to the impacts of road density. In contrast, the southeastern portion of the Study Area has the greatest potential for new impacts due to road development, as few existing roads are currently present and this area will see the greatest increase in road density due to the Project. As visible in Drawing 10.1A to 10.1R, this area is dominated by open areas, and the results of habitat suitability modelling indicate that this area offers predominantly neutral or fair habitat for mainland moose (Drawing 10.6). Based on pre-existing levels of fragmentation and disturbance in the LAA, and the low overall suitability of the Clearing Footprint for mainland moose, the impacts of the Project due to habitat loss and fragmentation are expected to be low.

Wood Turtles

The terrestrial habitats used by wood turtles include riparian areas along wetlands and watercourses, forested areas near watercourses, and sandy/gravelly deposits (NSNR, 2020c). These areas are used by wood turtles as they cross the landscape and support different biological needs and important life history stages. Habitat loss and fragmentation (e.g., through road development, agriculture, and forestry) pose a significant threat to wood turtles due to the high potential for isolating populations (ECCC, 2020b).

Although areas of suitable wood turtle habitat were observed during field surveys, no signs or observations of the species were recorded. The potential for impacts to wood turtle habitat are therefore predominantly limited to a northern section of the Study Area that coincides with a wood turtle SMP watercourse buffer and its associated watershed (though there is no overlap with infrastructure). In this area the Project road network predominantly consists of existing roads that will be upgraded for the Project, with new roads limited short access roads to connect turbine locations, and impacts to wood turtle habitat are expected to low.

Monarchs

Nova Scotia is in the range of the eastern population of monarchs and provides both breeding and staging habitat ahead of fall migration (MTRI, n.d.; NSNR, 2021g). The loss of breeding habitat, with consists of an abundance of nectar-producing plants and the presence milkweed, is considered the primary threat to monarchs in this province (NSNR, 2021g). However, populations of monarchs in Nova Scotia appear to be limited by the number of individuals that migrate to the province, and the availability of breeding habitat is generally not expected to be a significant limiting factor (NSNR, 2021g).

No occurrences of monarchs were recorded during field surveys; however, the species is known to occur in area and swamp milkweed was observed during flora surveys, suggesting the species has potential to occur in the Study Area. In the absence of detailed information about the distribution of milkweed plants and monarchs in the Clearing Footprint, it is difficult to assess the potential impacts of the Project on monarch breeding habitat. Considering that

habitat availability is not a limiting factor to the species in the province (NSNR, 2021g), impacts to monarch habitat due to the Project are expected to be low.

Sensory Disturbance

The Project may induce sensory disturbance in terrestrial fauna during all Project phases through the production of noise, the use of anthropogenic lighting, and the elevated presence of human activity in the LAA. Many species have sensitive windows for breeding and birthing, and small disruptions during these periods may reduce reproductive success in a population. Lovich and Ennen (2013) stress the importance of turbine siting relative to the needs of wildlife to minimize effects. The iterative Project design process has prioritized avoidance and interactions with important wildlife habitat such as wetlands and mature forest, which will reduce sensory disturbance in these areas.

Elevated sound levels have the potential to alter patterns of activity (including potential avoidance), stress levels, immune response, reproductive success, risk of predation, communication with conspecifics and antipredator predator behaviours, and hearing damage in fauna species (Lovich & Ennen, 2013; Rabin et al., 2006). Although the auditory capabilities of fauna species vary (Shannon, McKenna, et al., 2016), a literature review conducted by Shannon et al. (2016) found that an increase in stress and decrease in reproductive success in terrestrial mammals has the potential to occur at sound levels ranging from 52 to 68 dBA.

The sound levels produced by the Project will be highest during the site preparation and construction phase. Sound levels will vary by activity and noise will be primarily generated by vehicles, heavy machinery [e.g., backhoes, cranes, blasting (if required)], smaller equipment like welding tools, and backup alarms. Although construction noise will likely exceed the sound level reported by Shannon et al. (2016), sound levels will decrease with distance from the source and be of short-term duration. Due to the scale of the Project, it is likely that construction activities will be localized to one area of the Clearing Footprint at a time, with sensory disturbance expected to be low in the remaining areas. Sound levels will be reduced during the operations phase of the Project when noise will primarily be generated by turbines and occasional vehicle traffic.

Sensory disturbance to terrestrial fauna may also be caused by artificial lighting, which has the potential to cause disorientation or altering attraction/avoidance of an area (Longcore & Rich, 2004). During the construction phase, lighting will be restricted to the amount required to ensure the safety of Project personnel, and construction activities will be limited to daytime hours when feasible. Lighting during the operations phase will be minimal and turbine lighting at night will be restricted to navigation hazard lights mounted on the turbines.

Mainland Moose

As with other species of terrestrial fauna, mainland moose may experience sensory disturbance related to noise, lighting, and human activity generated by the Project. The general effects described above would pose a particular concern for mainland moose where they coincide spatially and temporally with sensitive life history events due to the low population size of the species.

Mainland moose breeding season takes place between September and October, with calving generally occurring in late May to early June, where one to two calves are born. Cows may require specific habitat types for calving, such as secluded islands, peninsulas, and shorelines. Seclusion is an important factor for protecting calves from predators. The cow and calf or calves remain together for one year until the calf or calves become mature enough for independence (NSNR, 2021j).

Mainland moose signs were observed along roads during fall and winter field surveys indicating that the Study Area currently provides some habitat value for the species. With limited desktop and field data about the age or sex diversity of individuals, it is not possible to confirm the extent to which the area is used for breeding or calving. The analysis of mainland moose habitat quality within the LAA has shown that the habitat suitability of the Study Area and Clearing Footprint is generally low, with areas of contiguous suitable habitat avoided by the Project. Mitigation measures will be implemented to minimize the impacts of sensory disturbance; however, the extent of pre-existing roads and forest disturbance observed across the landscape and the continued availability of suitable habitat in the LAA indicate that the magnitude of Project-related impacts to mainland moose life history will be low.

Wood Turtles

Sensitive windows for herpetofauna may relate to migration or nesting periods, and interference with these animals' activities during these windows may disrupt their natural life history. Interference may be both temporal and spatial. Project related activities occurring during sensitive windows may impact migratory or breeding behaviours, and habitat removal or fragmentation may create a physical barrier to herpetofauna species from reaching important habitat. Low impacts to the life history of wood turtles due to sensory disturbance are expected due to limited overlap of the Project with watersheds known to support wood turtles, as well as efforts to limit interactions with habitat features such as wetlands and watercourses.

Monarchs

Monarchs have been shown to be sensitive to artificial nighttime lighting, which disrupts their diurnal movements and ability to navigate (Parlin et al., 2022). The use of nighttime lighting for the Project will be limited to the amount required to ensure safe operations, which will help to reduce potential impacts on monarchs.

Injury and Mortality

The potential for Project-related injury and mortality to terrestrial fauna is primarily related to the development and use of roadways. Many roads in the Study Area are currently used for forestry activities and recreation by ATV, snowmobile, and dirt bike users; however, the Project involves the development of new roads and will increase traffic volumes within the Study Area and LAA. The potential effects of increased road traffic on terrestrial fauna will be greatest during the site preparation and construction phase when the greatest number of Project personnel will be travelling to and from the site. During the operations phase, the Project will only require a small number of technicians to access the site to perform regular maintenance and equipment checks.

A variety of small and large terrestrial mammals are known to use the roadways within the Study Area as evidenced by first-hand accounts by field staff, winter tracking/pellet surveys, and trail camera results (described in Section 10.2.4). Implementing speed limits on Project roads will help to reduce the risk of collisions with medium and large mammals such as porcupine, eastern coyotes, deer, and mainland moose. Some herpetofauna, such as salamanders and snakes, may face elevated road collision risk due to daily movements for foraging or seasonal migrations and being difficult to see (Wills, 2021). For species that are primarily active at night, such as salamanders, the risks of traffic-related injury and mortality due to the Project may be reduced as nighttime traffic volumes are expected to low.

Non-vehicle related injury or mortality may also occur due to the use or accidental release of substances that are harmful to fauna species. For instance, some herpetofauna may be indirectly impacted by road use through the application of road salt during winter driving conditions, as road salt is readily absorbed through their skin (Canadian Herpetological Society, 2025). Large mammals such as deer and moose are also known to be attracted to the salt that accumulates along roads which poses a health concern and increases their vulnerability to vehicle collisions (Seburn, 2017). The use of road salt for the Project will be limited to periods where it is required to ensure safe access is maintained, and the implementation of operational BMPs will reduce the risk of accidental spills (e.g., fuel) into the environment.

Uniquely, swarming and migrating insects are susceptible to mortality from collisions with wind turbines. There are a number of hypotheses as to whether, or why, these insects are attracted to wind turbines (Jansson et al., 2020; Long et al., 2010; Rydell et al., 2010). Questions remain in the literature concerning how this tendency affects mortality rates; whether insect fatalities at wind turbines contribute to population-level declines; and how fatalities impact ecological functions (e.g., pollination, predator-prey dynamics) (Voigt, 2021). No significant effects to invertebrate SAR are expected as a result of this Project based on current insect population and ecology research and a lack of confirmed invertebrate SAR within the Study Area.

Mainland Moose

Disease

Problematic native species have been identified as a pervasive threat to mainland moose due to their potential to spread debilitating disease. Specifically, white-tailed deer are hosts for brainworm (*Parelaphostrongylus tenuis*) and winter tick (*Dermacentor albipictus*), both of which cause mortality in moose and are thought to be regulators of population abundance and distribution (NSNR, 2021j). A possible concern associated with developments is their potential to cause indirect effects on mainland moose by increasing access to the site by white-tailed deer and therefore, increasing the chances of disease spreading to mainland moose.

There are four records of deer over-wintering area near the Project (NSNR, 2024d), and signs of white-tailed deer were observed throughout the Study Area during field assessments and directly observed by trail cameras. It is possible that new and upgraded roads will increase

access for white-tailed deer in some parts of the Study Area where existing road density is low. However, as deer have existing access to the Study Area, effects to mainland moose from disease due to the Project are expected to be negligible.

Poaching

Poaching, which is a threat to all terrestrial mammal species, but especially those with unstable populations, has been identified as a potential threat facing mainland moose in the Mainland Moose Recovery Plan (NSNR, 2021j). Increased human access to a given area (e.g., through land clearing and road development) has the potential to increase the risk of poaching for rare, sought-after animals. Portions of the Study Area are already highly accessible to the public, including local hunters and recreational users. The southeastern portion of the Study Area has the lowest amount of pre-existing roads and will experience a higher increase in public access due to the Project; however, habitat modelling suggests that this area may not be heavily used by moose as habitat suitability is low.

Due to the pre-existing access throughout much of the Study Area, overall effects to mainland moose from poaching due to the Project are expected to be low. Furthermore, the increased presence of staff within the Project may act as a deterrent to poaching.

Wood Turtles

Road traffic and the development of gravel roads pose unique risks for wood turtles as the species is known to be attracted to exposed gravel areas for nesting. This recognized ecological trap increases the risk of traffic-related mortality (ECCC, 2020b). No wood turtles, or signs thereof, were observed during field assessments. If wood turtles or other herpetofauna SAR are observed in the future, and if the implementation of mitigations are required, mitigation measures will be employed during sensitive windows (e.g., nesting) to minimize risk to SAR turtles.

Monarchs

Mortality due to vehicle collisions, particularly during fall migration, have been identified as a potentially significant contributor to the decline of monarch population (MTRI, n.d.). However, this pathway is not expected to pose a significant threat to monarchs in Nova Scotia relative to other parts of North America where monarchs are more common and roads are more abundant (NSNR, 2021g). As with other flying insects, monarchs have the potential to be impacted by collisions with turbine blades. The scarcity of information about risk levels specific to butterflies makes it difficult to assess the potential for impacts, though no significant effects are expected based on the Project based on the relatively low abundance of monarchs in Nova Scotia.

Mitigation Measures

To address the abovementioned effects to terrestrial fauna, the Proponent will develop and implement a Terrestrial Habitat and Wildlife Management Plan. Additionally, the following mitigation measures will be implemented:

Habitat Loss and Fragmentation

- Minimize overall area to be cleared by using previously altered areas (i.e., clearcuts) and optimizing the Project layout.
- Minimize habitat fragmentation and isolation by using pre-existing roads and previously altered areas where practicable during the design phase.
- Support landscape connectivity by maintaining vegetated buffers around wetlands and watercourses, where practicable.
- Road construction and upgrades will be designed to maintain surface water flow and avoid any permanent diversion, restriction, or blockage of natural flow, which may impact connectivity for species of herpetofauna.
- Allow for natural revegetation in the Clearing Footprint as possible to limit the effects of habitat loss and fragmentation.

Sensory Disturbance

- Maintain all equipment and machinery on site so that a level of good working condition is kept, reducing noise and vibration emissions.
- Use noise controls (e.g., mufflers) on machinery, equipment, etc. during the construction and operation phase.
- Limit use of lights to the amount necessary to ensure safe operation.
- Install motion activated lights on-site infrastructure, if practicable, to reduce insect attraction.

Injury and Mortality

- Design the Project Footprint to minimize total road length and use pre-existing roads where practicable.
- Install traffic signs to alert road users of speed limits and the presence of wildlife in the area.
 - Inform all Project-related staff working on the site of dangers to wildlife and create awareness around wildlife hotspots.
- Minimize Project-related traffic to reduce chances of wildlife collisions and traffic-related stress to wildlife.
- Prohibit harassment and feeding of wildlife by Project personnel.

Monitoring

Project-specific monitoring activities for terrestrial fauna are not being proposed.

Conclusion

After mitigations, residual effects to terrestrial fauna are characterized as shown in Table 10.18.

Table 10.18: Terrestrial Fauna Residual Effects

Effect Detail	Habitat Loss and Fragmentation	Sensory Disturbance	Injury or Mortality
Magnitude of Effect	Low: Small loss and fragmentation of habitat supporting fauna SAR	Low: Low impacts to fauna through sensory disturbance	Low: Low impacts to fauna through injury and mortality
Geographic Extent of Effect	5 km buffer of the Study Area	5 km buffer of the Study Area	5 km buffer of the Study Area
Frequency of Effect	Single Event: Effects expected to occur during construction phase	Intermittent: Effects occur occasionally or intermittently during one or more phase of the Project	Intermittent: Effects occur occasionally or intermittently during one or more phase of the Project
Duration of Effect	Medium Term: Effects will end following decommissioning	Medium Term: Effects will end following decommissioning	Medium Term: Effects will end following decommissioning
Reversibility of Effect	Partially Reversible	Reversible	Partially Reversible
Significance Level	Not Significant	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible			

10.3 Bats

10.3.1 Overview

A desktop review and field studies were undertaken to gather information on bat species and associated habitat. Objectives were as follows:

- Assess observations, species diversity, and habitat utilization of bats within the Study Area during the active bat period (spring to fall).
- Use the information collected to inform and refine the Project design (i.e., avoid impacts to SAR/SOCI and their habitats).
- Use the information collected to inform mitigation and management practices.

10.3.2 Regulatory Context

There are seven species of bats documented in Nova Scotia, of which four are year-round resident species and three are migratory species that overwinter in the southern United States. Resident species include the little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), tri-colored bat (*Perimyotis subflavus*), and big brown bat (*Eptesicus fuscus*). Migratory species include the eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and silver-haired bat (*Lasionycteris noctivagans*).

Three of the resident species (the little brown myotis, northern myotis, and tri-colored bat) are protected federally and provincially under SARA and ESA. These three species were listed as

Endangered under ESA on July 11, 2013, and were designated Endangered under Schedule 1 of SARA on November 26, 2014. The designation of these species under SARA and ESA was driven by the emergence of white-nose syndrome (a disease caused by the fungus *Geomyces destructans*), which was first detected in Canada in 2010 and led to a 90% population decline in Nova Scotia by 2013 (COSEWIC, 2013). All three migratory bat species were assessed by COSEWIC as Endangered in May 2023 (COSEWIC, 2023), but are not currently listed under SARA or ESA. The big brown bat is also not listed under SARA or ESA.

10.3.3 Desktop Review

Databases and online resources referenced as part of this desktop review include:

- Ecological Land Classification (ELC) for Nova Scotia (NSNR, 2015)
- Nova Scotia Old Growth Potential Index (NSNR, 2025b)
- Locations of Known Bat Hibernacula in Nova Scotia (Moseley, 2007)
- Nova Scotia Geoscience Atlas – Abandoned Mine Openings (NSNR, 2024a)
- Nova Scotia Significant Species and Habitats Database (NSNR, 2024d)
- ACCDC Data Report (ACCDC, 2026a)

Terrestrial Habitat Mapping

Terrestrial habitat mapping was conducted within a 5 km buffer around the Study Area to provide an estimate of potential maternity roosting habitat within and near the Study Area (Drawing 10.8). A distance of 5 km from the Study Area was selected as this is the distance most bats will travel from their roosting sites to foraging habitat (*Balzer et al., 2023; ECCC, 2015*). As such, this buffer should capture roosting habitat of most bats foraging within the Study Area. Habitat mapping was focused on SAR, but note that non-SAR bats found in Nova Scotia have overlapping preferences for maternity roosting habitat characteristics (*COSEWIC, 2023*) and are also captured within mapping described below.

According to the Canadian Wildlife Health Cooperative (2025), maternity roosting habitat may be provided by anthropogenic structures, rocky habitats such as cliff faces or caves, and mature forest with a high density of large diameter trees. Since anthropogenic structures and rocky habitats are difficult to accurately locate using available desktop resources, habitat mapping for this Project is limited to forest stands which may provide tree-roost habitat. Myotis species are known to roost in a variety of tall, large (i.e., > 30 cm in diameter) hardwood and softwood trees, while tri-colored bats in Nova Scotia roost mainly in beard lichens (*Usnea* spp.) growing on softwood trees (CWHC, 2024). Mapped suitable maternity roosting habitat consists of upland forest stands identified by provincial ELC (NSNR, 2015) which were also included in provincial old growth potential mapping (NSNR, 2025b).

Limitations of this model are that harvesting may have taken place within and near the Study Area in recent years which is not reflected in the datasets incorporated into this model, and that not all stands have been confirmed to contain mature, large diameter trees. Additionally, some habitat which does contain large trees or abundant beard lichens suitable to support maternity roosting may not have been captured. All maternity roosting habitat henceforth referred to as “suitable” should be considered “potentially suitable”.

Based on the results of the terrestrial habitat mapping, suitable maternity roosting habitat availability within 5 km of the Study Area, the Study Area, and the Clearing Footprint was evaluated (Table 10.19).

Table 10.19: Suitable Maternity Roosting Habitat within the LAA and Clearing Footprint

Range	Total Area	Area of Suitable Habitat	Percent of Total Area Consisting of Suitable Habitat
5 km Buffer of the Study Area	61,008 ha ⁽¹⁾	6,682 ha	11.0%
Study Area	22,056 ha	1,980 ha	9.0%
Clearing Footprint	1,716 ha	102 ha	5.9%

⁽¹⁾ Excludes marine area.

Locations of Known Bat Hibernacula

Moseley (2007) provides an overview of known and recorded bat hibernacula within Nova Scotia. This research indicates three known hibernacula within a 100 km radius of the Study Area (Table 10.20).

Table 10.20: Known Bat Hibernacula within 100 km of the Study Area

Hibernaculum	Approximate Distance to Study Area ⁽¹⁾	Direction
Hirschfield Galena Prospect	33.7 km	west
McLellans Brook Cave	78.8 km	northwest
New Lairg Adit #1 and #2	93.0 km	northwest

Source: (Moseley, 2007)

⁽¹⁾ Distance measured to the nearest point of the Study Area.

The nearest recorded hibernaculum to the Study Area is Hirschfield Galena Prospect, 33.7 km to the west near Glenelg, Nova Scotia. This hibernaculum is an abandoned mine adit with a surveyed length of 215 m suspected to support approximately 200 to 300 bats. The next closest recorded hibernaculum is McLellans Brook Cave, located 92 km to the west near McLellans Brook, Nova Scotia. This is an 85 m long dissolutional stream cave with associated observations of *Myotis* species around the cave but no records of underground bat activity (Moseley, 2007). The only other hibernaculum within 100 km of the Study Area is New Lairg Adit #1 and #2, two small AMOs near New Lairg, Nova Scotia. Bat activity has been observed around the mine entrances at this site, but underground activity has not been recorded. These hibernacula were assessed prior to the onset of white-nose syndrome in Nova Scotia, therefore, populations of bats using these habitats may vary from original estimates.

Abandoned Mine Openings

According to the British Columbia Ministry of Environment and Climate Change Strategy, Ecosystems Branch (2019), AMOs may serve as overwintering bat habitat if they have a depth greater than 30 m. Mine openings must also be of a suitable type (i.e., shafts, slopes, adits, or declines) and remain accessible to bats (i.e. not flooded, filled, capped, or plugged) to provide suitable habitat.

A total of 655 AMOs are documented within 25 km of the Study Area (NSNR, 2024a). Of these, five are open/dry mine shafts, slopes, adits, or declines with an original depth that could potentially support overwintering habitat for resident bat species (Drawing 10.8; Table 10.21). An additional 20 AMOs were unable to be evaluated due to a lack of information provided in the AMO Database (NSNR, 2024a) regarding the original or measured depth of the openings as well as the condition of any collar or plug. The remainder of AMOs within 25 km of the Study Area are not considered potential bat overwintering habitat as they were characterized as pits, trenches, or cuts, ponded or flooded, shallow in depth, infilled, capped, or plugged.

Table 10.21: AMOs with Potential to Support Bat Overwintering

Name	Location	Commodity	Opening Type	Original Depth (m)	Approximate Distance to Study Area (km) ⁽¹⁾
Griffin Gold Mining Company Hattie Belt Shaft	Goldboro	Gold	Shaft	33	1.1
N/A	Goldboro	Gold	Shaft	33	1.1
N/A	Goldboro	Gold	Shaft	33	1.1
N/A	Goldboro	Gold	Shaft	41	1.2
Maritime Minerals Limited A.C. Blair (Hayne) Tunnel	Country Harbour Mines	Gold	Adit	127	11.6

Source: (NSNR, 2024a)

⁽¹⁾ Distance measured to the nearest point of the Study Area

Significant Species and Habitat Records

The Significant Species and Habitats Database (NSNR, 2024d) contains 31 unique species/habitat records pertaining to bats and associated habitat within 5 km of the Study Area. Each of these are records relating to *Myotis* species (22), hoary bat (five), and unclassified bat species (four). All are within or overlap the Study Area.

ACCDC Records

The ACCDC Data Report (2026a) indicates two bat genera of concern recorded within 5 km of the Study Area (Table 10.22).

Table 10.22: Bat Species Recorded within a 5 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Bat species not big brown bat	<i>Vespertilionidae</i> sp. not <i>Eptesicus</i>	-	-	-	S1S2
Bat species not big brown bat	<i>Vespertilionidae</i> sp. not <i>Eptesicus</i>	-	-	-	S1S2

Source: (ACCDC, 2026a)

According to the ACCDC Data Report (2026a), a bat hibernaculum or species occurrence is known to exist within the Study Area. A representative of NSNR confirmed that there are no records of bat hibernacula in the Study Area and this record is related to a species occurrence (S. Spencer, personal communication, March 23, 2026).

10.3.4 Field Assessment

10.3.4.1 *Field Assessment Methodology*

Monitoring conducted within the Study Area consisted of passive acoustic monitoring during the 2023 and 2024 active bat seasons. Monitoring locations targeted a combination of turbine locations and ideal bat habitat features such as wetlands, mature hardwood forest, riparian river valleys, and forest edges using habitat mapping and accumulated knowledge from field studies. Monitoring locations were also adjusted between 2023 and 2024 to provide additional coverage within the Study Area (Drawing 10.9).

Acoustic monitoring was conducted using Song Meter SM4BAT FS and Song Meter Mini Bat detectors from Wildlife Acoustics. The detectors were programed to monitor from 30 minutes before sunset to 30 minutes after sunrise to correspond with peak bat activity. GPS points and supplementary information (i.e., habitat descriptions and photographs) for each monitoring location and set up were recorded using QuickCapture and Survey123 (Esri, 2024).

Passive acoustic monitoring in 2023 included the use of 24 detectors deployed for 113 consecutive days within the Study Area between August 16 and December 7, encompassing the late summer and fall active bat seasons (Table 10.23; Drawing 10.9). Not all detectors were deployed and retrieved on the same day, resulting in varied numbers of monitoring nights at different detectors. Detectors also experienced some data loss due to depleted batteries or technological malfunctions. One of the detectors (BAT04-23) was located, at the time due to inaccessibility, approximately 1.2 km outside the Study Area near New Harbour River. In addition, detector BAT02-23 was moved during monitoring to avoid the use of a private access road; the first location is BAT02-23A and the second location is BAT02-23B.

Table 10.23: Monitoring Periods for Detectors (2023)

Detector ID	Detector Location	Within 500 m of Turbine ⁽¹⁾	Habitat Description	Monitoring Duration (2023)	Number of Monitoring Nights ⁽²⁾
BAT01-23	45.200173, -61.627560	No	Swampy harvest along a dirt road	August 23 to December 20	77
BAT02-23A	45.230798, -61.397334	No	Edge of a lake surrounded by mature mixedwood forest	August 24 to October 13	50
BAT02-23B	45.183724, -61.367209	Yes	Harvest adjacent to a dirt road	October 13 to December 7	40
BAT03-23	45.183739, -61.421828	No	Young softwood forest between paved road and open bog	August 24 to December 7	79
BAT04-23	45.227931, -61.531751	No	Young mixedwood forest at the edge of a dirt road	August 24 to December 7	81
BAT05-23	45.192032, -61.548139	Yes	Clearing at the end of a dirt road surrounded by mid-age mixedwood forest	August 24 to December 7	80

Detector ID	Detector Location	Within 500 m of Turbine ⁽¹⁾	Habitat Description	Monitoring Duration (2023)	Number of Monitoring Nights ⁽²⁾
BAT06-23	45.234496, -61.642238	Yes	Shrub forest at the edge of a lake	August 23 to December 20	76
BAT07-23	45.251875, -61.585897	No	Mature softwood wetland along a wide watercourse	August 24 to December 7	87
BAT08-23	45.302735, -61.589767	Yes	Lacustrine spruce swamp	August 22 to December 7	51
BAT09-23	45.273299, -61.507498	Yes	Edge of mid-age spruce forest along a dirt road	August 22 to December 7	85
BAT10-23	45.327502, -61.569754	Yes	Edge of a wetland with abundant standing water along a dirt road	August 24 to December 6	89
BAT11-23	45.176384, -61.541673	No	Small spruce stand at lake edge near a dirt road	August 24 to December 7	90
BAT12-23	45.228496, -61.487975	Yes	Mature black spruce wetland at the edge of a clearing at the end of a dirt road	August 22 to December 7	86
BAT13-23	45.206892, -61.603694	Yes	Clearing at the end of a dirt road surrounded by young regenerating softwood forest	August 23 to December 20	81
BAT14-23	45.307811, -61.526476	No	Young softwood forest along a dirt road	August 24 to December 6	89
BAT15-23	45.182175, -61.448578	No	Open barrens	August 22 to December 7	82
BAT16-23	45.296814, -61.575055	Yes	Black spruce wetland at the edge of a dirt road	August 22 to December 6	84
BAT17-23	45.328128, -61.526677	Yes	Softwood forest surrounding a dirt road that crosses a small watercourse	August 24 to December 6	82
BAT18-23	45.186159, -61.609664	No	Edge of shrub swamp along a dirt road	August 23 to December 20	55
BAT19-23	45.258444, -61.615546	Yes	Clearing at the end of a dirt road surrounded by shrubby, regenerating harvest	August 23 to December 20	85
BAT20-23	45.221329, -61.596757	Yes	Regenerating mixedwood harvest with abundant snags	August 24 to December 20	70
BAT21-23	45.239165, -61.642213	No	Regenerating clear cut dominated by low shrubs	August 23 to December 20	85
BAT22-23	45.235160, -61.566829	No	Young mixedwood forest at the edge of a clearing at the end of a dirt road	August 24 to December 7	104

Detector ID	Detector Location	Within 500 m of Turbine ⁽¹⁾	Habitat Description	Monitoring Duration (2023)	Number of Monitoring Nights ⁽²⁾
BAT23-23	45.262125, -61.482951	Yes	Harvested area at the end of a dirt road	August 22 to December 7	53
BAT24-23	45.262165, -61.562744	Yes	Shrubby alder regeneration at the end of a dirt road	August 22 to December 7	32
Survey Total					1,873

⁽¹⁾ Distance is measured from the nearest turbine point location.

⁽²⁾ The number of monitoring nights does not include nights lost due to depleted batteries or technological malfunction. Each of the 23 detectors experienced between one and 75 nights of data loss, with an average of 30 nights lost.

Passive acoustic monitoring in 2024 included the use of 33 detectors deployed for 134 consecutive days within the Study Area between April 3 and August 15, encompassing the spring and early summer active bat seasons (Table 10.24; Drawing 10.9). Not all detectors were deployed and retrieved on the same day, resulting in varied numbers of monitoring nights at different detectors. The 2024 detectors also experienced some data loss due to depleted batteries or technological malfunctions.

Table 10.24: Monitoring Periods for Detectors (2024)

Detector ID	Detector Location	Within 500 m of Turbine ⁽¹⁾	Habitat Description	Monitoring Duration (2024)	Number of Monitoring Nights ⁽²⁾
BAT25-24	45.199498, -61.468751	No	Open barrens	April 17 to August 15	109
BAT26-24	45.200537, -61.627826	No	Open clearcut near dirt road	April 15 to August 15	69
BAT27-24	45.251452, -61.609346	No	Lake edge adjacent to dirt road and mature softwood forest	April 15 to August 14	69
BAT28-24	45.194672, -61.527657	No	Edge of open bog	April 16 to August 15	99
BAT29-24	45.221137, -61.577776	No	Lake edge adjacent to dirt road and mature softwood forest	April 16 to August 15	99
BAT30-24	45.240209, -61.638160	No	Edge between black spruce wetland and open clearcut	April 15 to August 15	115
BAT31-24	45.275641, -61.607059	No	Mature hardwood forest	April 4 to August 14	94
BAT32-24	45.239688, -61.562298	No	Dense softwood forest along a wide watercourse	April 16 to August 15	94
BAT33-24	45.182172, -61.448574	No	Open barrens	April 4 to August 14	76

Detector ID	Detector Location	Within 500 m of Turbine ⁽¹⁾	Habitat Description	Monitoring Duration (2024)	Number of Monitoring Nights ⁽²⁾
BAT34-24	45.211013, -61.504201	No	Mid-age softwood forest between brackish harbour and paved road	April 4 to August 15	105
BAT35-24	45.228381, -61.486910	Yes	Young mixedwood forest on a slope with abundant rock crevices near harvested area	April 16 to August 15	103
BAT36-24	45.272518, -61.574188	Yes	Young softwood forest adjacent to open clear cut	April 14 to August 14	67
BAT37-24	45.243661, -61.412747	No	Lacustrine bog near mature softwood forest	April 4 to August 15	112
BAT38-24	45.194672, -61.527657	No	Softwood forest edge along a flowing watercourse near inflow to a small lake	April 16 to August 15	93
BAT39-24	45.184973, -61.526042	Yes	Within an open fen	April 16 to August 15	103
BAT40-24	45.253816, -61.493347	No	Mid-age softwood forest along stillwater	April 4 to August 15	106
BAT41-24	45.187396, -61.474515	No	Powerline ROW within mid-age softwood forest near a paved road and saltwater harbour	April 4 to August 15	87
BAT42-24	45.182976, -61.612828	No	Young mixedwood forest at the edge of a regenerating cut	April 15 to August 15	86
BAT43-24	45.297952, -61.515648	No	Softwood forest at lake edge	April 17 to August 12	108
BAT44-24	45.163893, -61.550441	No	Edge of lacustrine bog surrounded by mature softwood forest	April 16 to August 15	98
BAT45-24	45.299168, -61.543574	No	Lacustrine treed swamp near mature hardwood forest	April 3 to August 14	117
BAT46-24	45.285655, -61.610039	No	Mature hardwood forest	April 4 to August 14	126
BAT47-24	45.319273, -61.586064	No	Roadside wetland, slightly saturated at the start of monitoring	April 4 to August 14	116

Detector ID	Detector Location	Within 500 m of Turbine ⁽¹⁾	Habitat Description	Monitoring Duration (2024)	Number of Monitoring Nights ⁽²⁾
			and became filled with >1 m of water during monitoring		
BAT48-24	45.296885, -61.586936	Yes	Edge of saturated treed swamp along dirt road near harvested areas	April 4 to August 14	120
BAT49-24	45.264717, -61.606698	No	Young mixedwood forest along a wide watercourse, across from mature mixedwood forest	April 15 to August 14	67
BAT50-24	45.272399, -61.522663	Yes	Edge of open bog	April 16 to August 12	90
BAT51-24	45.267352, -61.493159	Yes	Softwood windfall and dense regeneration between dirt road and watercourse	April 4 to August 12	71
BAT52-24	45.236012, -61.512826	No	Young forest with abundant deadfall at the edge of an outflow from stillwater	April 4 to August 15	117
BAT53-24	45.187514, -61.375424	Yes	Open bog surrounded by scrubby black spruce forest and harvested areas	April 17 to August 15	106
BAT54-24	45.251888, -61.585908	No	Softwood swamp along wide watercourse	April 16 to August 15	92
BAT55-24	45.207206, -61.386455	No	Edge of open bog	April 17 to August 15	108
BAT56-24	45.318519, -61.518014	No	Lacustrine shrub swamp surrounded by softwood forest	April 3 to August 14	75
BAT57-24	45.329192, -61.566146	No	Mature softwood edge along open wetland at the base of a slope with abundant windfall and regenerating softwoods	April 3 to August 14	100
Survey Total					3,197

⁽¹⁾ Distance is measured from the nearest turbine point location.

⁽²⁾ The number of monitoring nights does not include nights lost due to depleted batteries or technological malfunction. Each of the 33 detectors experienced between six and 65 nights of data loss, with an average of 29 nights lost.

Acoustic monitoring data (i.e., sonograms) was processed using Kaleidoscope Pro software from Wildlife Acoustics, complementary to the detectors used. Sonograms were analyzed for potential bat generated ultrasonic vocalizations and speciated when possible, first by the automatic identification feature of Kaleidoscope Pro and then manually by a trained biologist.

Due to their similarity, the calls of Nova Scotia's two resident *Myotis* species (little brown myotis and northern myotis) can be difficult to reliably distinguish from one another (O'Farrell & Gannon, 1999), so these calls were not identified to the species level. In addition, bat generated calls were identified as Unknown (UNKW) if the recording was within the correct frequency range for bats but was unable to be speciated based on the quality or length of the recording. Unknown calls between 20 kilohertz (kHz) and 35 kHz were labelled as unknown low frequency bats (UNLO) and unknown calls between 35 kHz and 120 kHz were labelled as unknown high frequency bats (UNHI).

After the completion of processing, the microphone sensitivity of any detector which recorded fewer than 100 files was tested to determine whether data at these detectors was reliable. Detectors BAT08-23, BAT11-23, BAT16-23, and BAT17-23 deployed for monitoring in 2023 and detectors BAT43-24, BAT44-24, BAT45-24, and BAT46-24 deployed for monitoring in 2024 were all determined to have microphones with unacceptably low sensitivity, meaning they did not have the capability to accurately record bat passes. Additionally, detector BAT30-24 experienced a technological malfunction which resulted in no data collection at this detector throughout 2024 monitoring. These detectors were excluded from analysis.

10.3.4.2 Field Assessment Results

In 2023, 31,323 files were recorded by acoustic detectors, of which 1,735 were determined to be bat generated ultrasound (Table 10.25). In 2024, 78,479 files were recorded by acoustic detectors, of which 4,027 were determined to be bat generated ultrasound (Table 10.25). The remaining files were determined to be caused by extraneous noise from sources such as vegetation, wind, or precipitation.

The following species were recorded during the 2023/2024 acoustic survey:

- *Myotis* species (MYOT)
- Eastern red bat (LABO)
- Hoary bat (LACI)
- Silver-haired bat (LANO)
- Tri-colored bat (PESU)
- Big brown bat (EPFU)
- Unknown bat (UKWN)
- Unknown low-frequency bat (UNLO)
- Unknown high-frequency bat (UNHI)

Table 10.25: Results of the Passive Acoustic Bat Survey (2023 and 2024)

Detector ID	MYOT	LABO	LACI	LANO	PESU	EPFU	UKWN	UNLO ⁽¹⁾	UNHI ⁽¹⁾	Bat Passes per Detector
2023 (August to December)										
BAT01-23	69	1	13	0	0	0	15	-	-	98
BAT02-23A	72	101	77	59	0	5	2	-	-	316
BAT02-23B	0	3	0	0	0	0	2	-	-	5
BAT03-23	3	0	3	5	0	0	7	-	-	18
BAT04-23	12	1	194	3	0	0	9	-	-	219
BAT05-23	2	2	48	1	0	0	0	-	-	53
BAT06-23	2	1	23	2	0	1	5	-	-	34
BAT07-23	111	84	82	13	2	0	11	-	-	303
BAT09-23	0	0	7	0	0	0	2	-	-	9
BAT10-23	8	1	14	2	1	0	7	-	-	33
BAT12-23	10	82	6	2	0	0	11	-	-	111
BAT13-23	0	4	4	0	0	0	4	-	-	12
BAT14-23	0	0	68	2	0	0	5	-	-	75
BAT15-23	5	5	14	131	0	17	17	-	-	189
BAT18-23	0	2	49	5	0	2	7	-	-	65
BAT19-23	5	2	67	2	0	0	4	-	-	80
BAT20-23	1	2	18	3	0	4	3	-	-	31
BAT21-23	3	3	3	0	0	0	2	-	-	11
BAT22-23	7	7	25	0	0	0	7	-	-	46
BAT23-23	5	0	7	1	0	0	3	-	-	16
BAT24-23	4	0	2	0	0	0	5	-	-	11
2023 Total	319	301	724	231	3	29	128	-	-	1,735
2024 (April to August)										
BAT25-24	13	0	5	1	0	0	0	0	5	24
BAT26-24	2	0	23	1	0	0	0	2	0	28
BAT27-24	95	4	26	0	0	0	0	0	24	149
BAT28-24	25	0	5	2	0	0	3	0	15	50
BAT29-24	108	18	70	1	0	0	0	1	120	318
BAT31-24	1	0	66	0	0	0	0	0	1	68
BAT32-24	107	5	146	0	0	0	0	4	29	291
BAT33-24	7	0	8	0	0	0	0	0	0	15
BAT34-24	311	1	305	1	0	0	0	5	506	1,129
BAT35-24	1	0	108	0	0	0	0	1	1	111
BAT36-24	1	0	4	0	0	0	0	6	0	11

Detector ID	MYOT	LABO	LACI	LANO	PESU	EPFU	UKWN	UNLO ⁽¹⁾	UNHI ⁽¹⁾	Bat Passes per Detector
BAT37-24	127	9	5	1	1	0	0	2	16	161
BAT38-24	464	1	26	1	0	0	0	4	21	517
BAT39-24	19	0	5	0	0	0	0	0	4	21
BAT40-24	224	2	65	1	0	0	0	0	43	335
BAT41-24	24	0	156	0	0	0	0	0	0	180
BAT42-24	1	0	53	0	0	0	0	0	0	54
BAT47-24	6	0	5	0	0	0	0	3	7	21
BAT48-24	18	1	22	0	0	0	0	0	4	45
BAT49-24	44	0	36	1	0	0	8	1	2	92
BAT50-24	10	0	5	0	0	1	0	0	0	16
BAT51-24	12	0	0	1	0	0	0	0	0	13
BAT52-24	0	0	0	0	0	0	0	0	0	0
BAT53-24	2	0	22	5	0	5	0	0	0	34
BAT54-24	43	0	89	0	1	6	0	1	1	141
BAT55-24	11	0	11	1	0	3	0	1	0	27
BAT56-24	133	0	1	8	7	12	0	0	0	161
BAT57-24	5	0	0	3	0	0	0	0	0	8
2024 Total	1,814	41	1,267	28	9	27	11	31	799	4,027

⁽¹⁾ Unknown low-frequency and unknown high-frequency were not distinguished for the 2023 monitoring period.

In 2023, migratory species accounted for about 73% of recorded bat passes while resident species accounted for approximately 20% of bat passes. Most resident species were identified as *Myotis* species and migratory species consisted mostly of hoary bats. The remaining 7% of bat passes consisted of unknown bats.

Detector BAT02-23A recorded the most bat passes during the 2023 monitoring period with 316 detections. Four other detectors recorded more than 100 bat passes during 2023 monitoring (BAT04-23, BAT07-23, BAT12-23, and BAT15-23). These detectors were deployed in a variety of habitat types (i.e., wetlands, forest edges, lacustrine forest, riparian forest, and open barrens), and were mainly clustered toward the center of the Study Area near New Harbour and Ocean Lake with the exception of BAT02-A, which was deployed at the eastern edge of the Study Area near Larrys River. Note that due to the irregular shape of the Study Area caused by the exclusion of New Harbour, the center of the Study Area is close to its edge. No turbines are proposed in the terrestrial area directly adjacent to New Harbour.

In 2024, resident species accounted for approximately 46% of recorded bat passes while migratory species accounted for about 33% of bat passes. The majority of resident species recorded were *Myotis* species, while the most commonly detected migratory species was the hoary bat. The remaining 21% of bat passes consisted of unknown bats.

Detector BAT34-24 recorded the most bat passes during the 2024 monitoring period at 1,129, accounting for just over 27% of the survey total. This detector was deployed in a small section of mid-age softwood forest located on a slope between a paved road and a brackish section of New Harbour. Ten other detectors recorded more than 100 bat passes, with four of those recording more than 200 bat passes. All but two detectors that recorded more than 100 bat passes were deployed adjacent to water (e.g., along a lake or watercourse). This activity may be related to foraging as bats may forage near or over water to capitalize on abundant insects. The detectors that recorded more than 200 bat passes (BAT29-24, BAT32-24, BAT34-24, BAT38-24, and BAT40-24) were mainly clustered toward the center and into the southern portion of the Study Area, in and around New Harbour and near Ocean Lake. As previously noted, this area, though central, is near the edge of the Study Area and not proximal to turbines.

The recorded activity level at each detector was considered in relation to its proximity to the nearest turbine. One of the five detectors that recorded the most bat activity in 2023 was deployed within 500 m of a proposed turbine, while the other four were more than 500 m from the nearest turbine. In 2024, one of the 11 detectors that recorded more than 100 bat passes was within 500 m of a turbine. Conversely, four of the five detectors that recorded the lowest activity in 2023 (12 or fewer bat passes) and three of the six lowest activity detectors in 2024 (20 or fewer bat passes) were located within 500 m of a proposed turbine. This indicates that turbines have generally been sited away from areas with higher levels of recorded bat activity.

Throughout the entirety of passive acoustic monitoring (a cumulative 4,199 monitoring nights), 5,762 bat passes were detected, resulting in an average of 1.37 bat passes per monitoring night across the Study Area (Table 10.26). BAT34-24 had the highest number of bat passes per night overall, BAT38-24 had the highest number of resident bat passes per night, and BAT02-23A had the highest number of migratory bat passes per night.

Table 10.26: Bat Passes Per Detector Night

Detector ID	Number of Bat Passes	Number of Detector Nights	Bat Passes Per Monitoring Night		
			Resident	Migratory	Total ⁽¹⁾
BAT01-23	98	77	0.90	0.18	1.27
BAT02-23A	316	50	1.54	4.74	6.32
BAT02-23B	5	40	0.00	0.08	0.13
BAT03-23	18	79	0.04	0.10	0.23
BAT04-23	219	81	0.15	2.44	2.70
BAT05-23	53	80	0.03	0.64	0.66
BAT06-23	34	76	0.04	0.34	0.45
BAT07-23	303	87	1.30	2.06	3.48
BAT09-23	9	85	0.00	0.08	0.11
BAT10-23	33	89	0.10	0.19	0.37
BAT12-23	111	86	0.12	1.05	1.29

Detector ID	Number of Bat Passes	Number of Detector Nights	Bat Passes Per Monitoring Night		
			Resident	Migratory	Total ⁽¹⁾
BAT13-23	12	81	0.00	0.10	0.15
BAT14-23	75	89	0.00	0.79	0.84
BAT15-23	189	82	0.27	1.83	2.30
BAT18-23	65	55	0.04	1.02	1.18
BAT19-23	80	85	0.06	0.84	0.94
BAT20-23	31	70	0.07	0.33	0.44
BAT21-23	11	85	0.04	0.07	0.13
BAT22-23	46	104	0.07	0.31	0.44
BAT23-23	16	53	0.09	0.15	0.30
BAT24-23	11	32	0.13	0.06	0.34
BAT25-24	24	109	0.12	0.06	0.22
BAT26-24	28	69	0.03	0.35	0.41
BAT27-24	149	69	1.38	0.43	2.16
BAT28-24	50	99	0.25	0.07	0.51
BAT29-24	318	99	1.09	0.90	3.21
BAT31-24	68	94	0.01	0.70	0.72
BAT32-24	291	94	1.14	1.61	3.10
BAT33-24	15	76	0.09	0.11	0.20
BAT34-24	1,129	105	2.96	2.92	10.75
BAT35-24	111	103	0.01	1.05	1.08
BAT36-24	11	67	0.01	0.06	0.16
BAT37-24	161	112	1.14	0.13	1.44
BAT38-24	517	93	4.99	0.30	5.56
BAT39-24	21	103	0.18	0.05	0.27
BAT40-24	335	106	2.11	0.64	3.16
BAT41-24	180	87	0.28	1.79	2.07
BAT42-24	54	86	0.01	0.62	0.63
BAT47-24	21	116	0.05	0.04	0.18
BAT48-24	45	120	0.15	0.19	0.38
BAT49-24	92	67	0.66	0.55	1.37
BAT50-24	16	90	0.12	0.06	0.18
BAT51-24	13	71	0.17	0.01	0.18
BAT52-24	0	117	0.00	0.00	0.00
BAT53-24	34	106	0.07	0.25	0.32
BAT54-24	141	92	0.54	0.97	1.53

Detector ID	Number of Bat Passes	Number of Detector Nights	Bat Passes Per Monitoring Night		
			Resident	Migratory	Total ⁽¹⁾
BAT55-24	27	108	0.13	0.11	0.25
BAT56-24	161	75	2.03	0.12	2.15
BAT57-24	8	100	0.05	0.03	0.08
Total	5,762	4,199	0.52	0.62	1.37

⁽¹⁾The number of total bat passes per detector night may not equal the sum of resident and migratory bat passes per detector night as the total also includes unknown species.

All but one detector recorded some level of bat activity, with varying numbers of bat passes and different species compositions being recorded at each location. Detector BAT34-24 recorded the most nightly activity, with 10.75 bat passes per night and 1,129 total bat passes. This detector was deployed from April to August in 2024 in the southern portion of the Study Area between Upper New Harbour and New Harbour West. This detector recorded a peak in hoary bat passes in April and a peak in activity of *Myotis* species and unknown high-frequency bats in July. Detectors BAT02-23A and BAT38-24 each also recorded more than five nightly bat passes. Detector BAT02-23A recorded a relatively even mix of *Myotis* species, hoary bats, silver-haired bats, and eastern red bats throughout September and October of 2023, while detector BAT38-24 recorded mainly *Myotis* species concentrated in July of 2024. Each of these detectors were in the southern portion of the Study Area and deployed near water, which may provide foraging opportunities for bats. None of these detectors were located within 500 m of a turbine.

Of the 58 total detectors, four detectors (BAT34-24, BAT38-24, BAT40-24, and BAT56-24) recorded more than two resident bat passes per night. These detectors were deployed throughout the Study Area along water surrounded by softwood forest. This may indicate the presence of nearby roosting habitat, as resident species may roost in softwood forests (CWHC, 2024). None of these four detectors were located within 500 m of a turbine.

Additionally, four detectors (BAT02-23A, BAT04-23, BAT07-23, and BAT34-24) recorded more than two migratory bat passes per night. Three of these detectors were located toward the center of the Study Area along the same watercourse (New Harbour River, which continues into New Harbour) and the fourth was deployed along the eastern edge of the Study Area near Larrys River. None of the detectors that recorded more than two migratory bat passes per night were located within 500 m of a turbine.

Overall, more bat passes per night were detected in 2024 than in 2023, with an increase of 0.5 bat passes per night between the two monitoring periods (Table 10.27). Most of the increase can be attributed to an increase in the number of resident bat detections. Differences may be attributed to inter-year or seasonal variability in local population, habitat use patterns, or behaviours. For example, detectors were deployed in different locations in 2023 and 2024, so variations may be related to different activity levels in different habitat types or different geographic locations within the Study Area. Additionally, more detectors were used in 2024 which allowed monitoring to target a wider variety of habitats. Monitoring was also conducted

at different times of year, with 2023 monitoring targeting the fall and 2024 monitoring capturing the spring.

Table 10.27: Comparison of 2023 and 2024 Monitoring Results

Monitoring Year	Number of Resident Bat Passes	Number of Migratory Bat Passes	Total Number of Bat Passes ⁽¹⁾	Number of Monitoring Nights	Number of Bat Passes Per Night
2023	361	1,259	1,749	1,566	1.1
2024	1,888	1,344	4,089	2,633	1.6

⁽¹⁾ The number of total bat passes may not equal the sum of resident and migratory bat passes as the total also includes unknown species.

Bat activity was analyzed monthly for the 2023 and 2024 monitoring periods (Figure 10.1). Note that the relatively low recorded activity levels in August 2023 and August 2024 likely reflect a reduced monitoring effort during these months rather than a lack of bat activity, as detectors were not deployed until August 22, 2023, and detectors were removed from the field by August 15, 2024.

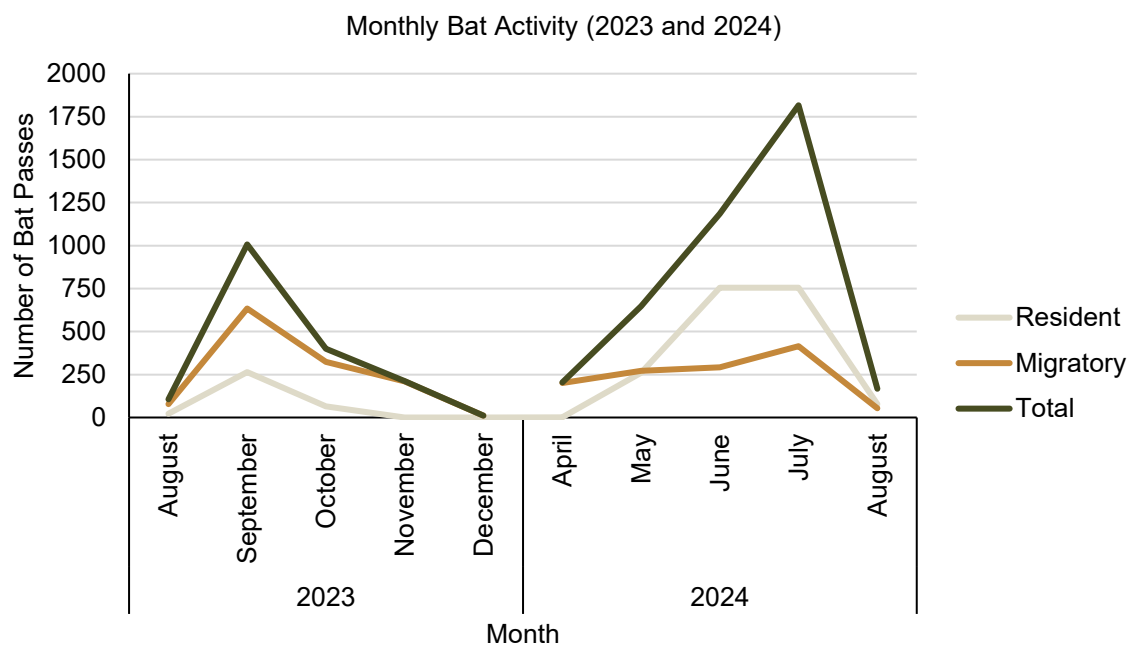


Figure 10.1: Bat Activity per Month by Species during the 2023 and 2024 Monitoring Period

The highest level of recorded bat activity throughout the monitoring period occurred in July 2024, with resident and migratory bat activity following similar trends. During the 2023 monitoring period, activity peaked in September and then steadily decreased into December. In 2024, activity increased steadily from April to July. Migratory bat activity was higher than resident bat activity during the fall migration season, which may indicate that some southern migration occurs through the Study Area. Resident bat activity was higher during the summer

maternity season (June and July), which may indicate that resident bats are feeding, roosting, and potentially raising pups (i.e., maternity roosting) in the area throughout the summer.

Bat calls were also analyzed hourly throughout the night for both monitoring periods (Figure 10.2).

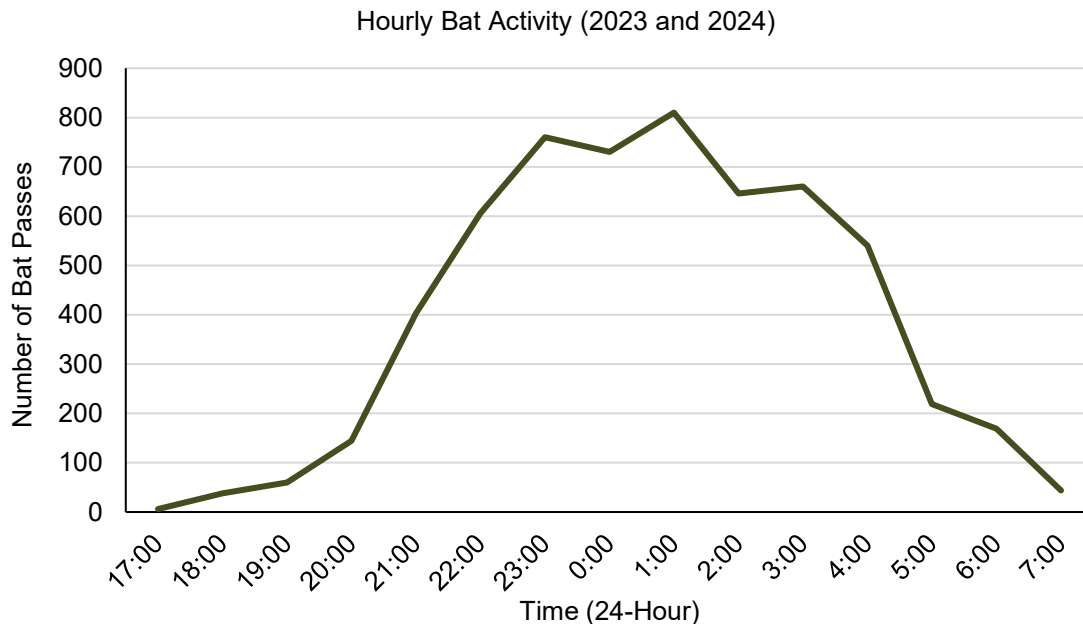


Figure 10.2: Bat Activity per Hour during the 2023 and 2024 Monitoring Period

Hourly bat activity was observed to begin after 17:00, increasing steadily to a peak around midnight, then decreasing gradually to the end of activity before 8:00. There is limited literature available for species specific levels of bat activity throughout the night. Factors that may influence the distribution of nightly bat activity include species presence and abundance, environmental conditions, foraging location, time of year, competition and resource partitioning, and/or diet (Fern et al., 2018; K. M. Gorman et al., 2021). The pattern of activity identified during monitoring is consistent with previously observed patterns exhibited by resident *Myotis* species described by Broders et al. (2003).

Priority Species

The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a) was utilized to identify any priority species and habitat associated with this Project. All bat SAR and SOCI, and their respective habitat associations identified within the Study Area through desktop review and field assessments were considered. Only those bat SAR and SOCI, and their respective habitats, with potential to interact with the Project have been designated as Project-specific priority species. Interactions may include removal or disturbance of a SAR and/or SOCI and/or their associated habitat. These priority species include:

- Little brown myotis
- Northern myotis
- Tri-colored bat
- Hoary bat
- Eastern red bat
- Silver-haired bat

Little Brown Myotis

The little brown myotis is the most common species in Nova Scotia and is likely ubiquitous in the province (Broders et al., 2003). During the day, the little brown myotis will roost under rocks or in buildings, trees, wood piles, and caves, often congregating in tight spaces (Fenton & Barclay, 1980). Maternity colonies may consist of hundreds of females and can occur in buildings, under bridges, or within tree cavities, among other habitat features (COSEWIC, 2013; ECCC, 2015). As a non-migratory species, the little brown myotis hibernates from September to early or mid-May in abandoned mines or caves (Fenton & Barclay, 1980; Moseley, 2007). *Myotis* species were recorded during the monitoring program; however, little brown myotis calls were not distinguished from the northern myotis. Little brown myotis are assumed to be present within the Study Area.

Northern Myotis

The northern myotis, once considered uncommon throughout Nova Scotia (Moseley, 2007), is likely ubiquitous in forested regions of the province (Broders et al., 2003). This species is widely distributed in the eastern United States and Canada and is commonly encountered during swarming and hibernation (Caceres & Barclay, 2000). During the day, northern myotis shows a preference for roosting in trees; however, the habitat preferences of females may vary according to their reproductive status (Garroway & Broders, 2008). Females appear to prefer shade tolerant deciduous trees over coniferous trees, whereas males tend to roost alone in coniferous or mixed-stands in mid-decay stages (Broders & Forbes, 2004). The northern myotis is also non-migratory and typically associated with the little brown myotis during hibernation, being found in caves or abandoned mines alongside this species (Moseley, 2007). Hibernation of the northern myotis is thought to begin as early as September and can last until May (Caceres & Barclay, 2000). *Myotis* species were recorded during the monitoring program; however, northern myotis calls were not distinguished from the little brown myotis. Northern myotis are assumed to be present within the Study Area.

Tri-colored Bat

Approximately 10% of the tri-colored bat's range is in Canada and the species is considered rare in Nova Scotia (COSEWIC, 2013). Documented observations of the tri-colored bat predominantly occur in the southwestern region of the province, especially during summer months (Broders et al., 2003). The tri-colored bat can be found in a variety of habitats but typically forages in covered riparian areas and around open bodies of water. Tri-colored bats in Nova Scotia typically roost in beard lichens growing on spruce or pine trees (CWHC, 2024). Hibernation begins in September and extends to early or mid-May, occurring in abandoned mines or caves with high humidity and above freezing temperatures (COSEWIC, 2013). The tri-colored bat was recorded within the Study Area during monitoring.

Hoary Bat

Hoary bats have the widest range among all native terrestrial mammals within the Western Hemisphere and are found across Canada and the United States (COSEWIC, 2023). As a result, hoary bats travel long distances (i.e., across the continent) during migratory periods, residing in coastal regions of Mexico and the United States during winter and migrating north in the spring. Hoary bats can be found roosting in the foliage of trees or shrubs in coniferous or deciduous forests of any age, but they prefer mature stands with abundant canopy cover and open flight space below. During lactation, females prefer to roost within the sheltered side of coniferous trees in mature forests (Klug et al., 2012). Foraging habitat for hoary bats is associated with open areas containing patches of trees such as fields, grasslands, or wetlands, though they tend to avoid heavily disturbed habitats such as transportation corridors, urban developments, and mines. Migration is thought to occur across coastal and/or large open areas (COSEWIC, 2023). The hoary bat was recorded within the Study Area during monitoring.

Eastern Red Bat

Eastern red bats are typically found east of the Rocky Mountains in Canada and the United States and in northeastern Mexico (COSEWIC, 2023). This species can travel thousands of kilometres during spring and fall migrations. Eastern red bats roost in similar habitat to hoary bats (described above), often roosting alone or with pups. Maternity roosts for this species are typically found in large diameter trees that reach or exceed the height of the surrounding canopy. Foraging habitat for eastern red bats includes both open and forested habitats as well as forest edges. Heavily disturbed habitats such as transportation corridors, urban developments, or mines are typically avoided by this species. Migration is thought to occur across coastal and/or large open areas (COSEWIC, 2023). The eastern red bat was recorded within the Study Area during monitoring.

Silver-haired Bat

The silver-haired bat is also widely distributed across Canada and the United States, extending from southern portions of the Northwest Territories and British Columbia east to Nova Scotia (COSEWIC, 2023). The silver-haired bat undertakes long distance migrations, residing in coastal regions of British Columbia and throughout the United States and Mexico during the winter and travelling north in the spring. Silver-haired bats typically roost in cavities or under the bark of large, decaying trees. Maternity roosts are usually small and found in decaying deciduous trees or in buildings. Foraging habitat is not well characterized, but is usually associated with forests, including forest edges and openings. Little is known about migration requirements for this species (COSEWIC, 2023). The silver-haired bat was recorded within the Study Area during monitoring.

10.3.5 Effects Assessment

Project-Bat Interactions

Project activities, primarily those involving vegetation clearing and turbine operation, have the potential to impact bats and bat habitat (Table 10.28). These activities could result in habitat loss and accidental injury or mortality. Other Project activities during construction and operation may impact bat behaviors such as increased noise and lighting.

Table 10.28: Potential Project-Bat Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	-
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	-
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	-
Site Reclamation	X

Assessment Boundaries

The LAA for bats includes a 5 km buffer of the Study Area (Drawing 10.10). As most bats forage within 5 km of their roosting sites (Balzer et al., 2023; ECCC, 2015), this area should capture roosting habitat of most bats foraging within the Study Area. The RAA is the boundaries of ecoregions that interest the Study Area, bounded by mainland Nova Scotia and the St. Mary's River. This area was selected to support the assessment of cumulative effects (Section 16.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 applies to bats. The VC-specific definition for magnitude is as follows:

- Negligible: No measurable loss of habitat supporting bats and loss of individuals is not expected.
- Low: Low loss of habitat supporting bats and loss of individuals is not expected.
- Moderate: Moderate loss of habitat supporting bats and/or minimal loss of individuals is expected.
- High: High loss of habitat supporting bats and/or loss of individuals at a level which may cause population level impacts is expected.

Effects

Potential impacts to bat species from the Project's construction and operation include:

- Habitat fragmentation and/or removal.
- Direct and/or indirect mortality.
- Sensory disturbance (i.e., lighting, noise, human activity, etc.).

Habitat Fragmentation and/or Removal

Vegetation clearing required for construction can result in the removal of bat habitat or disrupt corridors between important habitat features, such as foraging and roosting habitat (Reusch et al., 2022; Segers & Broders, 2014). This may impede movement, foraging, flight activity, and habitat use (ECCC, 2015). Harvesting and the creation of cleared areas can also reduce landscape-level habitat quality as well as result in increased predation risk as bats travel across open areas (Slough et al., 2023).

One study by Segers & Broders (2014) found that different species of bats respond differently to landscape alteration for wind farm development. Some bat species prefer edge habitat over both open clearcuts and intact interior forest as it can provide good foraging habitat (Hein et al., 2008). Little brown myotis has been shown to benefit from edge habitat created during harvesting and road construction, preferring to forage in cut blocks and road rights-of-way over intact forest (Segers & Broders, 2014; Slough et al., 2023). Harvesting can also create foraging habitat suitable for hoary bats and eastern red bats (COSEWIC, 2023). Alternatively, suitable foraging habitat for northern myotis may decrease following construction due to this species' preference to forage in forested areas and around canopy covered streams (Segers & Broders, 2014). Cavity-roosting species [i.e., little brown myotis, northern myotis, and silver-haired bat (COSEWIC, 2013, 2023)] can also experience a reduction in roosting habitat due to some forestry practices (COSEWIC, 2023). Pregnant and lactating female bats have been shown to be particularly sensitive to habitat degradation as their foraging ranges are more constricted due to decreased energy and caring for young (Henry et al., 2002; Segers & Broders, 2014).

The results of passive acoustic monitoring showed a mix of resident and migratory species, with resident bat passes representing approximately 38% of recorded activity and migratory species accounting for about 45%. Hoary bats accounted for about 77% of migratory detections while *Myotis* species accounted for about 97% of resident detections. According to a study by Perry & Thill, (2007), hoary bats prefer to roost in unmanaged mixedwood stands with an overstory age of more than 50 years. Females tend to establish maternity roosts in large coniferous trees of old growth forests (Klug et al., 2012). Additionally, according to the Recovery Strategy for the Little Brown Myotis, Northern Myotis, and Tri-colored Bat (ECCC, 2015), *Myotis* species prefer to roost in anthropogenic structures or in forests containing large diameter trees.

During old-growth surveys conducted within the Study Area (Section 10.1.4.2), eight of the 26 surveyed potential old-growth forest stands were confirmed as old-growth, ranging from 100 to 166 years of average stand age. The minimum average stand age for a forest to be considered

old growth is 100 years, which is older than the minimum age preferences for general over-day roosting of some bat species (Perry & Thill, 2007). This indicates that good quality over-day roosting habitat exists within the Study Area.

As discussed in Section 10.1.3, the Study Area is comprised of a range of forest types, shrublands, wetlands, and anthropogenic disturbance. Historic and ongoing forestry operations in the Study Area have resulted in modification to the natural habitat conditions. Based on terrestrial land cover types (Table 10.1), proportionally, the largest overall direct impacts from the Project are expected to be open areas (35.7%), softwood forest (22.0%), and cutover upland (18.7%). The percentage of softwood forest is higher in the LAA than within the Clearing Footprint, whereas the percentage of open areas and cutover upland is higher in the Clearing Footprint than in the Study Area. This demonstrates that the Project design and layout has prioritized the use of previously disturbed areas to minimize new impacts to terrestrial habitat. Impacts to undisturbed and unfragmented habitat will be low and although there will be small losses to terrestrial habitat associated with the Project, habitat functionality will remain intact relative to pre-construction conditions.

Based on habitat mapping completed for the Project, 102 ha of suitable maternity roosting habitat within the Study Area (approximately 5.2%) will be directly impacted by construction of the Project, leaving 1,878 ha of suitable maternity roosting habitat available within the Study Area. An additional 4,702 ha of suitable maternity roosting habitat will remain available in the LAA outside of the Study Area. As described in Section 10.1.4.2, historical and ongoing forestry operations have had particular impacts in the north and west portions of the Study Area, leaving behind a network of roads and trails that reduce and fragment habitat. Based on a visual review of aerial imagery, a portion of this predicted habitat (both within and outside of the Study Area) appears to have been previously harvested and thus would not support maternity roosting.

While the Project has prioritized the use of existing roads by incorporating approximately 129 km of existing roads into its design, road density is expected to increase in the Study Area following construction, with 94 km of new roads being built in association with the Project. Some bats, especially migratory species, may avoid high-traffic roads due to an increase in noise pollution (COSEWIC, 2023). A study by Fensome & Mathews (2016) found that 79% of bats crossed a two-lane rural road through forested habitat when vehicles were absent, but this decreased to 59% when vehicles were present. Crossings decreased to 14% without traffic and 3.5% with traffic in areas that lacked a tree line (Fensome & Mathews, 2016). As traffic is expected to be low within the Study Area at night while bats are active, the barrier effect of roads within the Study Area is anticipated to be minimal.

Impacts to bats from habitat fragmentation and removal are anticipated to be minimal based on the existing disturbance and habitat fragmentation within the LAA, the Project's maximized use of existing roadways and cleared areas, and avoidance of features such as wetlands and mature forests that may provide bat habitat.

Injury/Mortality

Wind project related bat injuries/mortalities are increasingly becoming a concern, as some researchers have highlighted that turbines could have a greater impact on bats than birds (Barclay et al., 2007). Bats have a slower life cycle than birds resulting in impacts to population dynamics when mortalities occur (Wellig et al., 2018). This is especially prominent where populations are already small, either naturally or due to the impacts of white-nose syndrome (ECCC, 2018).

Bat injuries/mortalities can result either from direct collision with turbine blades or from barotrauma, which is caused by the sudden decrease in air pressure following rotating blades (ECCC, 2015). Bats tend to collide with spinning turbine blades, and do not typically collide with stationary blades or towers (Arnett et al., 2008). Bats may collide with blades due to their inability to detect or avoid blades moving at high speeds, which can be up to 300 km/h at the tip of the blade (Wellig et al., 2018).

Research suggests that bats are attracted to wind turbines because wind turbines attract insects due to their light colour and because they are often built in high places that coincide with insect hilltopping behaviours (Guest et al., 2022). Swarms of insects that occur alongside wind turbines provide an excellent foraging opportunity for bats, especially migratory species that rely on stopover sites to feed during their migrations (Arnett et al., 2008; Guest et al., 2022). Wind turbines may also attract bats because they can be perceived as potential mating sites or roost trees or because of their movement and the sounds they create (Guest et al., 2022; Wellig et al., 2018). One study found that bats actively forage near turbines during operation (Horn et al., 2008). During this study, researchers observed bats approaching non-rotating and rotating blades, repeatedly investigating turbine elements, following or becoming trapped by blade-tip vortices, and colliding with turbine blades (Horn et al., 2008). Some research suggests that bats may exhibit attraction to or avoidance of wind turbines depending on inter-individual and interspecific variation (Reusch et al., 2022).

Bat activity and use of habitat within the Study Area was assessed through passive acoustic monitoring. Bat species identified during monitoring include *Myotis* species (little brown myotis and/or northern myotis), tri-coloured bat, hoary bat, silver-haired bat, eastern red bat, and big brown bat. Migratory species accounted for approximately 45% of recorded bat passes within the Study Area. Long distance migrating bats, including the eastern red bat, hoary bat, and silver-haired bat, comprise most of the reported mortalities from wind turbines due to their higher flight elevations and long migration distances (Arnett et al., 2008; ECCC, 2015; Parisé & Walker, 2017). In the COSEWIC Assessment and Status Report on the Hoary bat, Eastern red bat, and Silver-haired bat (2023), wind energy development was determined to have a high to very high impact, with these three species comprising approximately 75% to 80% of bat fatalities associated with wind turbines. A review of mortality studies at wind farms between 1996 and 2006 found that mortality consistently peaked during fall migration, between mid-summer and autumn (Arnett et al., 2008).

Myotis species have relatively low fatality rates compared to other species due to their lower flight elevations and short migration distances (ECCC, 2015); nevertheless, in the Recovery Strategy for Little Brown Myotis, Northern Myotis, and Tri-colored Bat, collisions and barotrauma from wind turbines were listed as a high level of concern in areas impacted by white-nose syndrome (like Nova Scotia), with localized seasonal impacts in the spring, summer, and fall (ECCC, 2015). *Myotis* species accounted for approximately 37% of recorded bat passes during monitoring.

To reduce the potential for bat mortality with wind turbines, scientific literature recommends that wind turbines be strategically sited away from bat habitats such as mature forests, wetlands, and waterbodies (Reusch et al., 2022; Roeleke et al., 2016). Turbine locations have been selected to maximize the use of previously disturbed habitat and avoid features such as lakes, wetlands, watercourses, and mature forests to the extent practicable. Turbines are also sited away from New Harbour River, which was found to have higher bat activity during acoustic monitoring. Additional opportunities to increase avoidance and minimization of interactions with these features will be reviewed during the detailed design phase.

Potential exists for bats to be harmed during vegetation clearing if they are roosting in vegetation as it is being cleared. This risk can be mitigated by targeting vegetation clearing between November 1 and April 30 while bats remain in hibernation underground. Injury and/or mortality is also possible if a hibernaculum is heavily disturbed while occupied. Construction activities, such as blasting or the use of heavy machinery, could potentially cause a hibernaculum to collapse (ECCC, 2015). According to Moseley (2007), no known hibernacula are located within 25 km of the Study Area. NSNR has also confirmed that no bat hibernacula are known within the Study Area (S. Spencer, personal communication, March 23, 2026).

Increased traffic associated with the construction of new roads and the upgrading of existing roads within the Study Area also poses a risk to bats in the LAA. Low-flying species, such as *Myotis* species, account for the majority of recorded vehicle-related mortality events, with juveniles being particularly vulnerable due to their reduced maneuverability and preference to forage in open, low-clutter habitats (Fensome & Mathews, 2016; Lesiński, 2007). Mortality is also likely to be higher in areas where roads intersect good habitat, such as watercourses or forest edges (Fensome & Mathews, 2016; Lesiński, 2007; Medinas et al., 2013). As traffic volumes on most roads within the LAA are not expected to be high at night, the risk of mortality associated with traffic volumes is anticipated to be low.

Sensory Disturbance

Noise and light will be generated during all phases of the Project. During construction, decommissioning, and reclamation, noise and lighting will be generated by heavy equipment. During operations, noise and light will be generated by wind turbines. During construction and reclamation, noise will typically occur during daylight hours, therefore, sensory disturbance should be limited to roosting bats.

Construction noise (e.g., heavy equipment, blasting, and pile-driving) may disrupt or deter bats, particularly those species that roost nearby, potentially causing roost abandonment; however, bats are well adapted morphologically, physiologically, and behaviourally to avoid acoustic trauma (CDT, 2016). Since bats are often exposed to the exceptionally loud sounds of their own echolocation signals (approximately 110 dB) they have evolved protective mechanisms to prevent sensory overload and damage to the auditory system (CDT, 2016). These mechanisms include behavioural avoidance, changing the shape and orientation of the pinnae, closing the cartilaginous fold in the outer ear canal, the tympanic reflex, and resonance absorption (Wever & Vernon, 1961). While these mechanisms are very effective in achieving protection from constant noise exposure (i.e., in the case of wind turbines), it is speculated that they also can prevent overexposure from sudden, unexpected anthropogenic noise shocks (e.g., blasting). The typical lack of construction activity during the nightly active bat period (30 minutes before sunset to 30 minutes after sunrise) further limits any potential masking effects in the ultrasonic ranges.

For bats, echolocation calls are in the ultrasonic range beyond the upper frequency limits of construction noise (CDT, 2016) meaning there is effectively no echolocation masking effect from construction noise. Additionally, construction activity during the nightly active bat period (30 minutes before sunset to 30 minutes after sunrise) is relatively low which further limits any potential masking effects in the ultrasonic ranges.

Sensory disturbance associated with lighting during the construction, operation, and decommissioning phases of the Project may also impact bat behaviour. During construction and decommissioning, lighting will be a temporary source of sensory disturbance. A study by Seewagen et al. (2023) found that, while white floodlights had no significant impact on migratory species (including the eastern red bat and hoary bat), little brown myotis was impacted within at least a 75 m radius and avoided foraging within this radius. This risk can be mitigated by utilizing motion-activated lights whenever practicable. During operation, turbine lighting will be restricted to the minimums required by Transport Canada for safety.

The impacts of necessary noise and light associated with the Project on bat behaviour and movements are anticipated to be low based on the morphological adaptations and behavioural patterns of bats, as well as the timing of activities that have potential to cause sensory disturbances outside of active bat periods (i.e., when bats are roosting or hibernating). Impacts will be limited to the Study Area, as only those bats roosting or foraging within areas undergoing construction will be exposed to sensory disturbance caused by the Project.

Mitigation Measures

To address the abovementioned effects to bat and bat habitat, the following mitigation measures will be implemented:

- Minimize overall area to be cleared by utilizing pre-existing roads and previously altered areas (i.e., clearcuts) where practicable.

- Maintain 30 m vegetated buffers around wetlands and watercourses, where practicable, to support connectivity and foraging habitat for bats.
- Plan clearing activities outside of April 15 to August 31 (encompasses the active bat window and bird breeding/nesting window) where practicable.
- Give preference to motion activated lights on infrastructure to reduce insect attraction and subsequent attraction of bats. Motion activated lighting is only applicable to ground-based infrastructure (i.e., at doorways and substations) as turbine lighting at the top of individual turbines is regulated by Transport Canada.
- Allow for natural revegetation of roadsides and other temporary works after construction to the greatest extent practicable.
- Employ noise controls (e.g., mufflers) on machinery, equipment, etc. during the site preparation and construction phase.
- Develop and implement a Surface Water Management Plan to support appropriate drainage around turbines and limit standing water, which will limit insect breeding near turbines and thus reduce the potential for the attraction of bats.
- Develop and implement a Terrestrial Habitat and Wildlife Management Plan.

Monitoring

The Proponent is committed to completing a second year of the baseline bat monitoring program, prior to operations, as per requirements under the Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d).

A detailed Post Construction Mortality Monitoring Plan will be developed and submitted to NSECC and NSNR for review. Monitoring activities may include:

- Post-construction bat mortality monitoring.
- Adaptive management if post-construction monitoring identifies significant bat mortality, developed in consultation with NSNR.

Conclusion

After mitigations, residual effects to bats have been assessed, including habitat fragmentation and/or loss, injury or mortality, and sensory disturbance. Based on this assessment, residual effects to bats are characterized as shown in Table 10.29.

Table 10.29: Bats and Bat Habitat Residual Effects

Effect Detail	Habitat Fragmentation and/or Loss	Injury or Mortality	Sensory Disturbance
Magnitude of Effect	Low: Low loss of suitable bat habitat is expected (about 1.5% of suitable habitat available within the LAA).	Moderate: Minimal loss of individuals is expected.	Low: Low impacts to habitat usage (i.e., effective habitat loss) due to sensory disturbance is expected.
Geographic Extent of Effect	5 km buffer of the Study Area	5 km buffer of the Study Area	5 km buffer of the Study Area

Effect Detail	Habitat Fragmentation and/or Loss	Injury or Mortality	Sensory Disturbance
Frequency of Effect	Single Event: Effects may only be associated with clearing during construction.	Intermittent: Effects may occur seasonally between dusk and dawn during operations and temporarily during construction.	Continuous: Effects may occur sporadically during construction and decommissioning but may be constant (though spatially limited) during operations.
Duration of Effect	Medium Term: Effects will end following decommissioning	Medium Term: Effects will end following decommissioning.	Medium Term: Effects will end following decommissioning.
Reversibility of Effect	Partially Reversible	Irreversible	Reversible
Significance Level	Not Significant	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible			

10.4 Avifauna

10.4.1 Overview

A desktop review, field program, and habitat modelling exercise were undertaken to gather information on avian species and associated habitat in the Study Area. Objectives were as follows:

- Assess observations, trends, species diversity, and habitat utilization of avian species within the Study Area during all seasons.
- Use the information collected to inform and refine the Project design (i.e., avoid and minimize impacts to avifauna species and their habitats, with a focus on SAR and SOCI.
- Assess migratory bird activity and assess the risk that the Project poses to migratory birds.
- Use the information collected to inform mitigation and management practices.

10.4.2 Regulatory Context

The Project has potential to interact with avifauna species that may be protected under several federal and provincial legislations. Applicable laws and regulations include:

- *Species at Risk Act* (Canada, 2002)
- *Migratory Bird Convention Act* (MBCA) (Canada, 1994)
- *Migratory Birds Regulations* (Canada, 2022)
- *Wildlife Act* (Nova Scotia, 1989)
- *Endangered Species Act* (Nova Scotia, 1998)

The MBCA protects all migratory birds while they are present in Canadian jurisdiction, including on land, in the air, and on the water. The Migratory Birds Regulations (Canada, 2022) protect the nests of species listed under Schedule 1 of MBCA for a set period, depending on the species. Nests of species listed under Schedule 1 can be registered under the Abandoned Nest Registry to begin a waiting period, after which the nest can legally be removed. Under the provincial *Wildlife Act*, it is illegal to destroy or disturb bird nests or eggs without a permit. ESA and SARA prohibit harm to listed SAR along with their habitually occupied spaces and designated core and/or critical habitat, as defined by each of these Acts.

The Project is also guided by policies, guidelines, and standards that provide guidance on the development of the Project and related survey design.

- ECCC-CWS (Atlantic Region) – Wind Energy & Birds EA Guidance Update (ECCC-CWS, 2022)
- Wind Turbines and Birds - Updated Guidance for EA and Monitoring (ECCC, 2018)
- Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b)
- Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (ECCC-CWS, 2007a)
- Nova Scotia Wetland Conservation Policy (NSECC, 2019b)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSECC, 2009a)
- Various NSNR SMPs and ECCC SAR Management Plans

10.4.3 Desktop Review

Desktop information was used to gain insight into protected avifauna habitats, species utilization of the area, and to identify SAR or SOCI potentially occurring within or near the Study Area, using the following sources:

- IBAs (2025)
- ACCDC (ACCDC, 2026a)
- Maritimes Breeding Bird Atlas (MBBA) (2025)
- Canadian Wildlife Service Waterbird Colony Database (Atlantic Region) (Wilhelm & Mahoney, 2017)
- Canadian Wildlife Service Migratory Bird Sanctuaries (MBS) (ECCC, 2021)
- NSNR Significant Species and Habitats Database (2024d)
- eBird (2025)
- Nova Scotia Parks and Protected Areas (NSECC, 2020a)
- Critical Habitat for SAR National Dataset (ECCC-CWS, 2025)

Important Bird Area: Country Island Complex (NS028)

The closest IBA is the Country Island Complex (NS028), a series of islands off the coast between the communities of Tor Bay and Drum Head. The closest island is approximately 2.4 km southwest of the Study Area, while the furthest is approximately 11.5 km west of the Study Area (Drawing 10.11).

Habitats featured on the islands include native grasses, inlets, and other coastal features (*IBA Canada, n.d.*). The Country Island Complex is known to provide nesting habitat for roseate tern (*Sterna dougallii*), common tern (*Sterna hirundo*), Arctic tern (*Sterna paradisaea*), Leach's storm-petrel (*Hydrobates leucorhous*), Herring gull (*Larus argentatus*), and great black-backed gull (*Larus marinus*). There are also several summertime records of Manx shearwater (*Puffinus puffinus*) within the IBA, although their breeding status in Nova Scotia is considered unknown by ACCDC (2026b).

The federally and provincially Endangered roseate tern has been recorded nesting on islands within the Country Island Complex since the late 1980s, with one island within the complex (Country Island) considered critical habitat for the species (*ECCC-CWS, 2025*). In 1996, the IBA supported around 37.5% of the national population (*IBA Canada, n.d.*). The roseate tern population has fluctuated drastically over the years (largely due to predation by gulls) and some colonies within the IBA are considered "intensely managed", with research programs and recovery efforts underway (*NSNR, 2021h*).

In addition to nesting terns, the complex also supports a large Leach's storm-petrel colony. Approximately 50,000 pairs were estimated to be nesting on Country Island in 1998, representing 2% of the western Atlantic population (*IBA Canada, n.d.*).

ACCDC Report

S-Ranks from ACCDC were used to determine whether a species is a SOCI, based on the time of year in which the species was observed. Species ranks may differ depending on whether a species is observed in the breeding season (B), the non-breeding season (N), or during migration (M). Tennessee warbler (*Leiothlypis peregrina*), for example, is ranked S3B,S5M, indicating that this species is considered a SOCI in Nova Scotia during its breeding season but not during its migratory seasons.

The ACCDC report for the Project (ACCDC, 2026a) contained records of 14 avian SAR (Table 10.30 and 42 avian SOCI (Appendix H) within 5 km of the Study Area.

Table 10.30: Avian SAR Recorded within a 5 km Radius of the Study Area

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	Recorded Within the Study Area?
Bank Swallow	<i>Riparia riparia</i>	Threatened	Threatened	Endangered	S3B	No
Barn swallow	<i>Hirundo rustica</i>	Special Concern	Threatened	Endangered	S3B	Yes
Bobolink	<i>Dolichonyx oryzivorus</i>	Special Concern	Threatened	Vulnerable	S2S3B	No
Canada warbler	<i>Cardellina canadensis</i>	Special Concern	Threatened	Endangered	S2S3B	Yes
Chimney Swift	<i>Chaetura pelagica</i>	Threatened	Threatened	Endangered	S2S3B,S2 S3M	No

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank	Recorded Within the Study Area?
Common nighthawk	<i>Chordeiles minor</i>	Special Concern	Special Concern	Threatened	S3S4B	Yes
Eastern Meadowlark	<i>Sturnella magna</i>	Threatened	Threatened	Not Listed	SHB	No
Eastern wood-pewee	<i>Contopus virens</i>	Special Concern	Special Concern	Vulnerable	S3S4B	No
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Special Concern	Special Concern	Vulnerable	S3B,S3N	Yes
Olive-sided flycatcher	<i>Contopus cooperi</i>	Special Concern	Special Concern	Threatened	S3B	Yes
Piping Plover <i>melodus</i> subspecies	<i>Charadrius melodus melodus</i>	Endangered	Endangered	Endangered	S1B	Yes
Roseate Tern	<i>Sterna dougallii</i>	Endangered	Endangered	Endangered	S1B	No
Rusty blackbird	<i>Euphagus carolinus</i>	Special Concern	Special Concern	Endangered	S2S3B	Yes
Short-eared Owl	<i>Asio flammeus</i>	Threatened	Special Concern	Not Listed	S1B	No

Source: (ACDC, 2026a)

The Study Area contains records of Canada warbler (*Cardellina canadensis*), common nighthawk (*Chordeiles minor*), olive-sided flycatcher (*Contopus cooperi*), and rusty blackbird (*Euphagus carolinus*), all of which breed in wetlands and/or open habitats. Evening grosbeak (*Coccothraustes vespertinus*), which breeds in mature coniferous and/or mixedwood forest, has also been recorded within the Study Area.

While there are records of barn swallow (*Hirundo rustica*) and piping plover (*Charadrius melodus*) within the Study Area, suitable breeding habitat for these species appears to be absent. Barn swallow typically nests in human-made structures (e.g., barns, houses, bridges, etc.), which are not abundant due to the remote nature of the Study Area. The Study Area does, however, contain suitable foraging habitat for this species, which includes wetlands, waterbodies, and open areas. Piping plover nests on sandy beaches, which are absent from the Study Area; however, the coastal proximity of the Project suggests that this species could transit the Study Area during migration.

Bank swallow (*Riparia riparia*), bobolink (*Dolichonyx oryzivorus*), chimney swift (*Chaetura pelagica*), eastern meadowlark (*Sturnella magna*), eastern wood-pewee (*Contopus virens*), roseate tern, and short-eared owl (*Asio flammeus*) have been recorded within 5 km of the Study Area, but not within the Study Area itself. Eastern wood-pewee prefers mature mixedwood and deciduous forest, often near wetlands or riparian areas, and could potentially occur within the Study Area.

The remaining species are habitat specialists that require habitat features which appear absent from the Study Area [e.g. vertical sandy banks or human-made excavations (bank swallow), grasslands and/or agricultural fields (bobolink, eastern meadowlark, and short-eared owl), coastal islands (roseate tern), and chimneys or old growth forests with large, hollow snags (chimney swift)]. While these species are not anticipated to nest within the Study Area, they may pass through the Study Area while foraging or during migration.

The ACCDC report also contains one record of a “location sensitive” SAR:

- Peregrine falcon (*Falco peregrinus* pop. 1): Listed as Vulnerable by ESA and ranked S1B,SUM by ACCDC. Peregrine falcon is likely present in the area due to the expanse of coastline and large lakes for foraging, as well as intense topography that may be suitable for nesting outside of the Study Area (i.e., coastal areas with exposed rock).

Avian SAR and SOCI records within 100 km of the Study Area are provided in Appendix H.

Maritimes Breeding Bird Atlas

The Study Area is primarily located within MBBA squares 20PR00, 20PR10, 20PR20, 20PR01, and 20PR11.

Records from the first (1986 to 1990) and second (2006 to 2010) editions of the MBBA within these squares are as follows:

- For map square 20PR00, the first atlas contained records of one possible, one probable, and one confirmed breeder. The second atlas contains records of 44 possible, 16 probable, and 21 confirmed breeders.
- For map square 20PR01, the first atlas contained records of one possible, one probable, and zero confirmed breeders. The second atlas contains records of 20 possible, six probable, and 18 confirmed breeders.
- For map square 20PR10, the first atlas contained records of 30 possible, three probable, and 42 confirmed breeders. The second atlas contains records of 39 possible, 11 probable, and 22 confirmed breeders.
- For map square 20PR11, the first atlas contained no records. The second atlas contains records of 29 possible, 14 probable, and 10 confirmed breeders.
- For map square 20PR20, the first atlas contained records of 46 possible, two probable, and zero confirmed breeders. The second atlas contains records of 36 possible, 13 probable, and 31 confirmed breeders.

Between the five squares, 121 species were recorded, including 11 SAR (Table 10.31).

Table 10.31: Avian SAR Recorded within MBBA Squares 20PR00, 20PR01, 20PR10, 20PR11, and 20PR20

Species	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
Barn Swallow	<i>Hirundo rustica</i>	Special Concern	Threatened	Endangered	S3B
Bank Swallow	<i>Riparia riparia</i>	Threatened	Threatened	Endangered	S2B
Bobolink	<i>Dolichonyx oryzivorus</i>	Special Concern	Threatened	Vulnerable	S2S3B
Canada Warbler	<i>Cardellina canadensis</i>	Special Concern	Threatened	Endangered	S2S3B
Common Nighthawk	<i>Chordeiles minor</i>	Special Concern	Special Concern	Threatened	S3S4B
Eastern Wood-pewee	<i>Contopus virens</i>	Special Concern	Special Concern	Vulnerable	S3S4B
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	Special Concern	Special Concern	Vulnerable	S3B,S3N
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Special Concern	Special Concern	Threatened	S3B
Piping Plover	<i>Charadrius melodus</i>	Endangered	Endangered	Endangered	S1B
Rusty Blackbird	<i>Euphagus carolinus</i>	Special Concern	Special Concern	Endangered	S2S3B
Short-eared Owl	<i>Asio flammeus</i>	Threatened	Special Concern	Not Listed	S1B

Source: (ACCD, 2026b; Birds Canada, 2025)

CWS Waterbird Colony Database

The CWS Waterbird Colony Database (Atlantic Region) (Wilhelm & Mahoney, 2017) contains records of 13 waterbird colonies within 5 km of the Study Area. The colonies are primarily located on offshore islands, and range between 1.6 km and 4.4 km from the Study Area (Drawing 10.11). These include:

- A common eider (*Somateria mollissima*) colony located near Isaacs Harbour.
- Colonies of unspecified tern species, American herring gull, and great black-backed gull on Harbour Island.
- Colonies of American herring gull and great black-backed gull on Goose Island.
- Colonies of American herring gull and great black-backed gull on Frying Pan Island.
- Colonies of Arctic tern, common tern, roseate tern, unspecified tern species, black guillemot (*Cepphus grille*), common eider, American herring gull, great black-backed gull, Leach's storm-petrel on Country Island.
- Colonies of American herring gull, great black-backed gull, and double-crested cormorant on Coddles Island.
- Colonies of American herring gull, great black-backed gull, double-crested cormorant, and unspecified cormorant species on Bar Island.
- Colonies of American herring gull, great black-backed gull, and unspecified cormorant species on Thrumcap Island.

- Colonies of American herring gull, great black-backed gull, and unspecified tern species near New Harbour Cove.
- A common eider colony near Tor Bay.
- Colonies of Arctic tern, common tern, roseate tern, unspecified tern species, American herring gull, and great black-backed gull near Charlos Cove.

Migratory Bird Sanctuaries

There are no Migratory Bird Sanctuaries within 5 km of the Project.

NSNR Significant Species and Habitats Database

The NSNR Significant Species and Habitats Database (NSNR, 2024d) contained 26 records relating to avifauna within 5 km of the Study Area (Drawing 10.11), as follows:

- Four records relating to habitat for bald eagle (*Haliaeetus leucocephalus*), boreal owl (*Aegolius funereus*), northern harrier (*Circus hudsonius*), and osprey (*Pandion haliaetus*).
- Four records relating to feeding and/or overwintering habitat for harlequin duck (*Histrionicus histrionicus*), common merganser (*Mergus merganser*), common eider, and unspecified waterfowl species.
- Six records relating to nesting habitat for common eider, double-crested cormorant, roseate tern, unspecified tern (*Sterna* sp.), and unspecified seabird species.
- Nine records relating to Canada warbler habitat, all of which are within the Study Area.
- One record relating to olive-sided flycatcher habitat within the Study Area.
- One record relating to eastern wood-pewee habitat within the Study Area.
- One record relating to rusty blackbird habitat 1.9 km north of the Study Area.

eBird

The citizen science database eBird (2025) showed several notable birding locations (i.e. hotspots) between the coastal communities of Goldboro and Tor Bay. The most active hotspots were located 400 m to 500 m from the Study Area, in New Harbour (New Harbour - New River Estuary and New Harbour - Beach and Village) and had 107 and 132 species recorded, respectively. Both hotspots contained records of a variety of seabird, shorebird, and waterfowl species.

Notable observations include several large flocks of migrating shorebirds:

- Lesser yellowlegs (*Tringa flavipes*; 150)
- Semipalmated plover (*Charadrius semipalmatus*; 970)
- Semipalmated sandpiper (*Calidris pusilla*; 300)
- Short-billed dowitcher (*Limnodromus griseus*; 400)

Several SAR have been observed at these locations, including:

- Bank swallow
- Barn swallow

- Evening grosbeak
- Peregrine falcon
- Piping plover
- Roseate tern
- Rusty blackbird

Protected and Conserved Areas Database

The Canadian Protected and Conserved Areas Database (ECCC, 2024b) identified two nature reserves and four wilderness areas within 5 km of the Project (Drawing 10.11). The closest is Loon Lake Nature Reserve, which is located in the northern portion of the Study Area and features old-growth tolerant hardwood forest (NSECC, n.d.c). Mature, forested habitats are of significant importance for cavity-nesting birds such as owls, woodpeckers, and various waterfowl species (Neily & Parsons, 2017).

Chedabucto Fault Nature Reserve, located adjacent to the northern boundary of the Study Area, runs south of a large watercourse (Horton Brook) and appears to feature intact mixed to deciduous forest, as well as several treed wetlands.

Isaacs Harbour River Wilderness Area, located adjacent to the northern boundary of the Study Area, contains mature hardwood forest, softwood forest of varying ages (NSECC, n.d.c), and appears to feature various wetlands and waterbodies. American goshawk (*Astur atricapillus*) has been noted as frequenting this wilderness area, although nesting status in the area is unknown (NSECC, n.d.c).

Guysborough Headlands Wilderness Area, located just south of the Study Area, features a variety of coastal habitats, including barrier beaches, ponds, low cliffs, rock and cobble shoreline, and tidal flats (NSECC, n.d.c). These features can provide valuable nesting, feeding, and overwintering habitat for a variety of seabird, shorebird, waterfowl, and raptor species. The interior portion of the wilderness area consists primarily of coastal barrens, bogs, and stunted spruce-fir forest. These features can provide nesting habitat for SAR like rusty blackbird and olive-sided flycatcher, which prefer softwood dominant wetlands (COSEWIC, 2006, 2018b; Neily & Parsons, 2017).

Bonnet Lake Barrens Wilderness Area, located east of the Study Area, features barrens, coastal spruce-fir forest, bogs, lakes, and other water features (NSECC, n.d.c). Large, undisturbed lakes and wetland complexes within this wilderness area likely provide breeding and migratory habitat for a variety of waterfowl and shorebird species. Large expanses of softwood forest and softwood dominant wetlands may also provide habitat for boreal forest species like Canada jay (*Perisoreus canadensis*), boreal chickadee (*Poecile hudsonicus*), and black-backed woodpecker (*Picoides arcticus*), and SAR like rusty blackbird and olive-sided flycatcher (COSEWIC, 2006, 2018b).

Ogden Round Lake Wilderness Area, located north of the Study Area, features mature deciduous forest and various lakes, rivers, and wetlands (NSECC, n.d.c). These habitats can

support a wide variety of avifauna, including cavity-nesting species and Species at Risk such as eastern wood-pewee, which prefer mature, mixed to deciduous forest (COSEWIC, 2012b).

Critical Habitat for Species at Risk

The Critical Habitat for Species at Risk National Dataset (ECCC-CWS, 2025) contains one record relating to avifauna, associated with Country Island, located approximately 6.5 km south of the Study Area. Country Island provides nesting habitat for the federally and provincially Endangered roseate tern, with the island's importance highlighted in the Roseate Tern (*Sterna dougallii*) Amended Recovery Strategy (ECCC, 2010). This document defines roseate tern critical habitat as any site that supports more than 15 nesting pairs (i.e. greater than 10% of the Canadian population). In 1996, Country Island supported around 37.5% of the Canadian population (IBA Canada, n.d.) although numbers have fluctuated drastically over the years, largely due to predation by gulls. The colony is considered "intensely managed" with predator management programs in place, aimed at increasing fledging success (ECCC, 2010).

10.4.4 Field Assessment

10.4.4.1 Field Assessment Methodology

Several survey methodologies were employed to assess avian abundance and species diversity within and near the Study Area throughout the year. Prior to conducting field surveys, a preliminary desktop survey design [using provincial aerial imagery (e.g., Google Earth, NSECC, and NSNR), forestry, wetland, watercourse, depth-to-water, and topographic databases or GIS layers] was developed to target suitable habitat for avifauna species or groups of interest (e.g., migratory birds, breeding birds, shorebirds, waterfowl, and nightjars).

Since species have different habitat requirements for breeding and migratory purposes, a wide range of habitats were targeted, with a goal of achieving representative coverage of all major habitat types in the Study Area. Habitat types surveyed included wetlands, lakes, watercourses and riparian areas, harvested areas in varying stages of regeneration, softwood, hardwood, and mixedwood forest, and coastal mudflats.

The following survey types were completed.

- Winter point count (PC) surveys
- Spring and fall migration point count surveys
- Spring and fall migration diurnal watch count (DWC) surveys
- Breeding bird point count surveys
- Nightjar surveys

Survey dates were selected to provide representative coverage across appropriate seasons and to ensure migratory bird abundance and species diversity was fully captured (e.g., early and late season migrants). A breakdown of survey type, dates, and rationale is described in Table 10.32. Habitat descriptions for the point count locations are found in Table 1 (Appendix N).

Table 10.32: 2023 Avifauna Field Survey Overview

Survey Type	Survey Locations	Dates	Rationale	Reference for Survey Dates and Methods
Winter birds	80 PC	January 25 to February 8, 2023 February 13 to 23, 2023 March 12 to 26, 2023	Winter bird surveys help capture resident species and migratory species that may overwinter within the Study Area.	Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b)
Spring migration	80 PC and 5 DWC	April 15 to 25, 2023 May 10 to 30, 2023	Most migratory birds return to Canada to breed between late March and mid-May. Surveys were completed between April and May to capture both early and late season migrants, as well as early breeding activity.	Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b)
Breeding bird	80 PC	June 15 to 29, 2023 July 11 to 14, 2023	June is peak breeding season in Nova Scotia. Surveys were completed in June and July to capture early and late season breeders.	Maritimes Breeding Bird Atlas (Birds Canada, 2025)
Nightjar	14	June 29 to July 2, 2023 July 9 to 14, 2023	The goal of these surveys was to understand the use of the land within the Study Area by nightjars. Suitable habitat for one nightjar species, common nighthawk, is thought to be present within the Study Area based on historical records.	Canadian Nightjar Survey Protocol (Knight et al., 2019)
Fall migration	80 PC and 5 DWC	August 4, 2023 (Coastal DWC Only) August 16, 2023 (Coastal DWC Only)	Most migratory birds begin to migrate south between August and September. Surveys were completed between August and October to capture both	Wind Turbines and Birds - A Guidance Document for EA (ECCC-CWS, 2007b)

Survey Type	Survey Locations	Dates	Rationale	Reference for Survey Dates and Methods
		August 23 to September 10, 2023 (PC and DWC)	early and late season migrants.	
		October 3 to 17, 2023 (PC and DWC)	Coastal DWC surveys began two weeks earlier than the other surveys to fully capture shorebird migration,	
		October 18 to 31, 2023 (PC and DWC)	which peaks in mid-August (NSDNR, 2006).	

Due to the remoteness of the Study Area, the mobility of avian species, and dynamic nature of designing a large Project, a focus on habitat diversity was prioritized, as well as Assessment Area coverage where possible, during field surveys. Avian specialist and subcontractor, Chris Pepper, selected survey locations during preliminary site reconnaissance and using aerial imagery sources for support. The Project underwent several additional layout iterations (within the Study Area) over the next two field seasons as part of site optimization and to minimize interactions with other environmental features identified during footprint surveys. While the field survey locations do not completely overlap with the final Assessment Area, they do represent the diversity of habitat and species within the Study Area, and when combined with detailed habitat modelling and other habitat survey results, support a robust analysis. Survey locations are presented in Drawing 10.12 and Drawing 10.13.

Point Counts – Spring/Fall Migration, Winter Birds, and Breeding Bird Surveys

Point count surveys were used as the primary means of identifying species in the Study Area through all seasons. A total of 80 point count locations were distributed throughout a variety of habitat types within the Study Area, including forests, lakes, wetlands, barrens, and harvested areas. Point counts were 10 minutes in duration and were completed at predetermined locations. All visual and auditory observations of birds were recorded at each point count location, along with relevant behavioural information such as breeding evidence. The estimated distance to target, direction, and number of species is recorded, while the observer remains still and silent for the duration of the survey interval. Surveys were completed 30 minutes before, through four hours after dawn in any given season to observe the most active time of day for passerine species. Survey opportunities were maximized for clear weather and minimal wind within the appropriate timeframe. Target species of point counts are primarily passerines, identified audibly.

During the point count surveys, all signs of breeding behaviour (e.g., agitation, carrying food, nest building, the presence of a pair of birds in suitable nesting habitat) were documented. Breeding evidence codes from the MBBA (MBBA, 2006) were used to determine breeding status based on field observations. Breeding evidence was described using the following four categories:

- Observed: The species was observed in its breeding season, but no breeding evidence was observed.
- Possible: Breeding is possible based on species' presence in suitable nesting habitat during its breeding season or based on the presence of a male singing in suitable nesting habitat in its breeding season.
- Probable: Breeding is probable based on strong indicators of breeding behaviour (e.g., nest building, agitated behaviour, the presence of a pair in suitable nesting habitat during the breeding season).
- Confirmed: Breeding is confirmed based on the observation of behaviour which indicates the presence of an active nest (e.g., recently fledged young, a nest containing eggs or young, nest building behaviour, an adult carrying food, distraction display).

Nightjar Surveys

Nightjar counts were six minutes in duration and completed at 14 predetermined locations throughout the Study Area, following the Canadian Nightjar Survey Protocol (Knight et al., 2019). Survey locations were situated in open habitats (e.g. clearcuts, lakes, and wetlands) where nightjars were most likely to be observed foraging. As the target species, all nightjars (nighthawks, etc.) were recorded with information on direction, behaviour (if applicable), and distance from the observer. Other diurnal or nocturnal species (e.g., owls) were also recorded. Surveys were conducted from dusk until two hours after dusk on clear nights with minimal wind and no precipitation. Survey locations were limited to roads or trails due to safety concerns with evening surveys.

Diurnal Watch Count Surveys – Spring/Fall Migration Surveys

Diurnal watch count surveys, also known as hawk watch surveys, were completed to assess the movement of birds within and flying over the Study Area during the day (e.g., potential migratory behaviour). These surveys help capture the movements of raptors and other birds that migrate during the day and would therefore not be captured by radar or acoustic monitoring programs, which target nocturnal migrants. These surveys were completed for up to 180 minutes, usually starting in the late morning, after morning point count surveys are completed. Observations on the movement of birds were recorded, including bearing from the observer, distance to the target, the direction that the target was moving, its passing height, and any other behaviour notes.

Five locations with open, unobstructed views of the sky were selected within or near the Study Area. Four locations were situated in clearcuts overlooking lakes within the Study Area, while a fifth location was situated along an estuary in New Harbour, approximately 500 m outside the Study Area. Based on desktop review, the estuary serves as a migratory stopover for shorebirds, and sizeable flocks are known to feed there during fall migration. While the rest of the fall migration surveys began in late August 2023, two additional early season surveys (August 4 and August 16, 2023) were completed at the New Harbour estuary to fully capture shorebird migration, which peaks in mid-August (NSDNR, 2006).

The absence of observable migration patterns or notable events during field surveys does not rule out such activity in the area. Radar and acoustic monitoring programs have a higher likelihood of detecting large migration events since they record data for longer periods of time, including at night. Many species migrate nocturnally and may therefore be missed or under-represented by field surveys conducted in the morning. The radar and acoustic monitoring programs are intended to help fill this gap.

10.4.4.2 Field Assessment Results

2023 Winter Bird Surveys

Three rounds of winter bird surveys were completed between late January and late March 2023. Across all surveys, a total of 392 birds were observed, representing 23 different species (Tables 2 and 3, Appendix N).

The most abundant species observed:

- Black-capped chickadee (*Poecile atricapillus*)
- Golden-crowned kinglet (*Regulus satrapa*)
- Common raven (*Corvus corax*)
- Boreal chickadee

Avian SOCI observed:

- American goshawk (1)
- Boreal chickadee (46)
- Canada jay (6)

No avian SAR were observed. The survey locations with the highest avian abundance were PC10 (softwood forest habitat), PC70 (softwood forest habitat) and PC13 (softwood forest habitat near a riparian area). Species diversity was relatively low, which is typical of winter surveys, and did not vary widely between survey locations.

2023 Spring Migration Surveys

Two rounds of spring migration surveys, comprising of point count and diurnal watch count surveys, were completed between mid-April and late May 2023.

Spring Migration Point Count Surveys

During spring migration point count surveys, a total of 2,002 birds were observed, representing 80 different species (Tables 4 and 5, Appendix N).

The most abundant species observed:

- Palm warbler (*Setophaga palmarum*)
- White-throated sparrow (*Zonotrichia albicollis*)

- Yellow-rumped warbler (*Setophaga coronata*)
- Magnolia warbler (*Setophaga magnolia*)
- Ruby-crowned kinglet (*Corthylio calendula*)

Avian SOCI observed:

- Boreal chickadee (22)
- Black-backed woodpecker (3)
- Bufflehead (*Bucephala albeola*; 5)
- Canada jay (8)

Avian SAR observed:

- Canada warbler (3)
- Olive-sided flycatcher (1)
- Rusty blackbird (1)

Canada warbler and olive-sided flycatcher observations were made in mid-to-late May, in wetlands and/or forested habitats, and could either represent migrants or individuals that had recently arrived on their breeding grounds. The rusty blackbird observation was made in mid-May, in mixedwood forest with wetlands nearby. This species is considered one of the earliest spring migrants in Atlantic Canada, with most individuals arriving on their breeding grounds in March and April and initiating nesting as early as mid-April (ECCC, 2015a; MTRI, n.d.). Based on the timing of this observation and known rusty blackbird breeding phenology, this observation may represent a locally breeding individual. This individual was presumably utilizing a large wetland complex outside of the Assessment Area.

The survey locations with both the highest avian abundance and species diversity were PC56 (lake edge habitat), PC63 (softwood forest habitat), and PC69 (softwood forest habitat). Migratory activity was highest among passerines, with small groups of species like yellow-rumped warbler, palm warbler, magnolia warbler, and red-winged blackbird (*Agelaius phoeniceus*) observed moving through the Study Area. Cupboard Lake, on the eastern side of the Study Area, was noted as providing stopover habitat for a variety of waterfowl species [e.g. American black duck (*Anas rubripes*), bufflehead, common merganser, and wood duck].

Spring Migration Diurnal Watch Count Surveys

A total of 1,057 birds were observed during spring migration diurnal watch count surveys, representing 35 different species (Table 6 and 7, Appendix N).

The most abundant species observed:

- American herring gull
- American black duck
- Bufflehead

- Greater yellowlegs (*Tringa melanoleuca*)
- American crow (*Corvus brachyrhynchos*)

Avian SOCI observed:

- Bufflehead (179)
- Canada jay (1)
- Common tern (20)
- Eastern kingbird (*Tyrannus tyrannus*; 1)
- Least sandpiper (*Calidris minutilla*; 4)
- Lesser yellowlegs (5)
- Short-billed dowitcher (8)
- Willet (*Tringa semipalmata*; 29)

Avian SAR observed:

- Barn swallow (9)

The barn swallow observations were made during May, when several individuals were observed foraging over clearcuts and lakes within the Study Area.

New Harbour Estuary (DWC1) was the location with the highest avian abundance and species diversity. This location accounted for approximately 83% of the individuals recorded during spring migration diurnal watch count surveys, owing to its coastal proximity which allowed for a variety of seabird, shorebird, and waterfowl species to be recorded. Shorebird species at this location (greater yellowlegs, least sandpiper, lesser yellowlegs, short-billed dowitcher, and willet) were observed in small numbers (totaling 134 individuals) and were not observed at any of the inland locations within the Study Area, suggesting that these species generally follow the coast during the day.

Raptor activity was highest inland at DWC5 (near Loon Lake) and DWC6 (near Ocean Lake), where 25 and 22 individuals were observed, respectively. Bald eagle, osprey, red-tailed hawk (*Buteo jamaicensis*), and turkey vulture (*Cathartes aura*) were the most abundant species. Raptor activity was relatively low at New Harbour Estuary (DWC1), where only a small number of broad-winged hawk, merlin, and osprey were observed.

Waterfowl activity was highest at New Harbour Estuary (DWC1) where 439 individuals, consisting of seven species, were observed. The most abundant species were American black duck, bufflehead, and Canada goose (*Branta canadensis*). Waterfowl activity was relatively low inland, where only a small number of American black duck and green-winged teal (*Anas carolinensis*) were observed.

Most birds observed in flight were flying at heights of 50 m or less (38%) or between 50 m and 100 m (41%), while approximately 21% were flying at heights greater than 100 m. Birds flying

at heights greater than 100 m were typically raptors, gulls, and corvids, while passerines, shorebirds, and waterfowl primarily flew at heights below 50 m. Further analysis of flight heights is provided in Appendix O.

2023 Spring Migration Surveys - Probable and Confirmed Breeding Evidence

Breeding evidence can be observed before the core breeding season begins, particularly for bird groups like waterfowl and raptors whose courtship often takes place throughout winter and early spring. Observations of probable and confirmed breeding evidence, based on the MBBA (MBBA, 2006) include:

- Confirmed breeding evidence (recently fledged young): American robin (*Turdus migratorius*), American goldfinch (*Spinus tristis*), American kestrel (*Falco sparverius*), common grackle (*Quiscalus quiscula*), common loon (*Gavia immer*), and red-winged blackbird.
- Probable breeding evidence (agitated behaviour): White-throated sparrow.
- Probable breeding evidence (courtship or display): Ruffed grouse (*Bonasa umbellus*), spruce grouse (*Canachites canadensis*), tree swallow (*Tachycineta bicolor*), and Wilson's snipe (*Gallinago delicata*).
- Probable breeding evidence (pair in suitable breeding habitat): American kestrel, black-and-white warbler (*Mniotilta varia*), blackpoll warbler (*Setophaga striata*), and dark-eyed junco (*Junco hyemalis*).

2023 Breeding Bird Surveys

Two rounds of breeding bird surveys, comprising point count surveys, were completed in June and July 2023. Across all surveys, a total of 2,130 birds were observed, representing 63 different species (Tables 8 and 9, Appendix N).

The most abundant species observed:

- White-winged crossbill (*Loxia leucoptera*)
- White-throated sparrow
- Magnolia warbler
- Common yellowthroat (*Geothlypis trichas*)
- Hermit thrush (*Catharus guttatus*)

Avian SOCI observed:

- American kestrel (2)
- Blackpoll warbler (1)
- Boreal chickadee (6)
- Canada jay (16)
- Cape May warbler (*Setophaga tigrine*; 1)
- Greater yellowlegs (3)

Avian SAR observed:

- Canada warbler (17)
- Olive-sided flycatcher (5)

Canada warbler was observed at 13 locations within the Study Area between mid-June and mid-July. The observations were primarily associated with treed wetlands and riparian areas, which represent suitable breeding habitat. In most cases, the wetlands were outside of the Assessment Area or in areas where infrastructure was once proposed but has since been moved. One observation was made in a wetland within the Assessment Area. The olive-sided flycatcher observations were made in three locations within the Study Area between late June and mid-July. These observations were generally associated with riparian habitats outside of the Assessment Area.

The survey locations with the highest avian abundance were PC40 (disturbed softwood forest habitat), PC13 (riparian habitat), and PC66 (softwood forest habitat). The locations with the highest species diversity were PC65 (lake edge habitat) and PC53 (forested wetland habitat). Locally breeding shorebird species like greater yellowlegs and spotted sandpiper (*Actitis macularius*) were found to be using several lakes and wetlands within the Study Area. Ocean Lake, the largest lake within the Study Area, was found to support a variety of shorebird, waterfowl, and raptor species.

The Study Area is largely coniferous, and conifer-dependent species [e.g. white-winged crossbill, red crossbill (*Loxia curvirostra*), Canada jay, boreal chickadee, and purple finch (*Haemorhous purpureus*)] were highly abundant. White-winged crossbill was the most abundant species across all breeding bird surveys, with flocks of up to 50 individuals regularly observed moving through the Study Area,

2023 Breeding Bird Surveys - Probable and Confirmed Breeding Evidence

Notes on breeding evidence were recording during all breeding bird surveys (MBBA, 2006). For species with multiple indications of probable or confirmed breeding evidence, the highest level of breeding evidence is provided.

- Confirmed breeding evidence (recently fledged young): American herring gull, black-throated green warbler (*Setophaga virens*), blue jay (*Cyanocitta cristata*), Canada jay, dark-eyed junco, palm warbler, red crossbill, spruce grouse, Swainson's thrush (*Catharus ustulatus*), white-winged crossbill, and winter wren (*Troglodytes hiemalis*).
- Confirmed breeding evidence (nest containing young): Hairy woodpecker (*Leuconotopicus villosus*).
- Confirmed breeding evidence (carrying food): American redstart (*Setophaga ruticilla*) and common yellowthroat.
- Probable breeding evidence (agitated behaviour): American robin, black-and-white warbler, hermit thrush, and yellow-rumped warbler.

- Probable breeding evidence (presumed territory - observed in the same location twice during the breeding season): Alder flycatcher (*Empidonax alnorum*), American crow, bay-breasted warbler (*Setophaga castanea*), black-capped chickadee, blue-headed vireo (*Vireo solitarius*), Canada warbler, golden-crowned kinglet, least flycatcher (*Empidonax minimus*), Lincoln's sparrow (*Melospiza lincolnii*), magnolia warbler, mourning warbler (*Geothlypis Philadelphia*), Nashville warbler (*Leiothlypis ruficapilla*), northern flicker (*Colaptes auratus*), northern waterthrush (*Parkesia noveboracensis*), olive-sided flycatcher, ovenbird (*Seiurus aurocapilla*), purple finch, red-eyed vireo (*Vireo olivaceus*), ruby-crowned kinglet, spotted sandpiper, yellow-bellied flycatcher (*Empidonax flaviventris*), and yellow-bellied sapsucker (*Sphyrapicus varius*).

2023 Nightjar Surveys

Two rounds of nightjar surveys were completed between late June and mid-July 2023. A total of 13 individuals were observed, representing six different species (Tables 10 and 11, Appendix N). Seven common nighthawk observations were made, all on July 14 during the second round of surveys. Nightjars were detected at four of the 14 surveys locations. Nightjar activity was highest at CON127 (forested habitat with wetlands and harvested areas nearby), where three individuals were observed.

The following species were observed incidentally:

- Boreal chickadee (SOCl)
- Dark-eyed junco
- Greater yellowlegs (SOCl)
- Olive-sided flycatcher (SAR)

The olive-sided flycatcher was observed on July 14 and was associated with wetland habitat on the eastern side of the Study Area.

2023 Fall Migration Surveys

Three rounds of fall migration surveys, consisting of point count and diurnal watch count surveys, were completed between late August and late October 2023, while two additional rounds of diurnal watch count surveys were completed at DWC1 (New Harbour Estuary) in early August and mid-August to target shorebird migration.

Fall Migration Point Count Surveys

During fall migration point count surveys, a total of 2,707 birds were observed, representing 71 different species (Tables 12 and 13, Appendix N).

The most abundant species observed:

- White-winged crossbill
- Purple finch
- American robin
- Golden-crowned kinglet
- Purple finch

Avian SOCI observed:

- American goshawk (1)
- Black-backed woodpecker (5)
- Boreal chickadee (38)
- Canada jay (32)
- Indigo bunting (*Passerina cyanea*; 1)
- Virginia rail (*Rallus limicola*; 2)

There were no avian SAR were observed.

The survey locations with the highest avian abundance were PC8 (forested wetland habitat), PC51 (mixedwood forest habitat), and PC199 (a clearcut). The locations with the highest species diversity were PC33 (disturbed softwood forest habitat), PC10 (a regenerating cut), PC34 (softwood forest habitat), and PC49 (disturbed mixedwood forest habitat).

Conifer-dependent species like white-winged crossbill, red crossbill, pine siskin (*Spinus pinus*), and purple finch accounted for approximately 48% of the birds observed during fall migration point counts. White-winged crossbill and pine siskin were particularly abundant, with flocks of up to 90 individuals regularly observed moving through the Study Area. Flocks of other passerine species like American robin, bohemian waxwing (*Bombycilla garrulus*), cedar waxwing (*Bombycilla cedrorum*), yellow-rumped warbler, and dark-eyed junco were also encountered regularly. Several uncommon fall migrants, lark sparrow (*Chondestes grammacus*), dickcissel (*Spiza americana*), and indigo bunting, were observed moving through the Study Area between September and October.

Fall Migration Diurnal Watch Count Surveys

A total of 7,029 birds were observed during fall migration diurnal watch count surveys, representing 61 different species (Tables 14 and 15, Appendix N).

The most abundant species observed:

- Semipalmated plover
- Semipalmated sandpiper
- Short-billed dowitcher
- White-winged crossbill
- Pine siskin

Avian SOCI observed:

- American goshawk (1)
- Black-bellied plover (*Pluvialis squatarola*; 34)
- Boreal chickadee (1)
- Canada jay (11)

- Least sandpiper (75)
- Lesser yellowlegs (232)
- Nelson's sparrow (*Ammospiza nelsoni*; 2)
- Pine grosbeak (*Pinicola enucleator*; three)
- Red-breasted merganser (*Mergus serrator*; 6)
- Sanderling (*Calidris alba*; 6)
- Semipalmated plover (2,059)
- Semipalmated sandpiper (930)
- Short-billed dowitcher (838)
- White-rumped sandpiper (*Calidris fuscicollis*; 44)

Avian SAR observed:

- Barn swallow (6)
- Peregrine falcon (2)

The barn swallow observation consisted of several individuals foraging at New Harbour Estuary (DWC1) in early August, which could represent either local breeding individuals or early fall migrants. The peregrine falcon observation consisted of a pair soaring within the Study Area in October. This species typically follows the coast during migration, but some individuals migrate further inland and may forage along lakes (COSEWIC, 2017).

The location with the highest avian abundance and species diversity was New Harbour Estuary (DWC1). While three rounds of surveys were completed at the other fall migration point count and diurnal watch count locations, five survey rounds were completed at DWC1. Two additional rounds were added in August to fully capture fall shorebird migration, which peaks in mid-August (NSDNR, 2006). A total of 5,875 shorebirds were recorded at the estuary, which represents 84% of the birds recorded between all fall migration diurnal watch count locations.

Nine shorebird species were recorded at this location, the most common of which were semipalmated plover, semipalmated sandpiper, short-billed dowitcher, and lesser yellowlegs. These species each totaled between several hundred and several thousand individuals. Smaller numbers of black-bellied plover, greater yellowlegs, least sandpiper, sanderling, and white-rumped sandpiper were also recorded, totaling less than 100 individuals per species.

No shorebird observations were made at three inland (i.e., within the Study Area) diurnal watch count locations surrounding Ocean Lake and Loon Lake. Several observations of black-bellied plover, semipalmated plover, and semipalmated sandpiper were made at DWC8, located within the Study Area approximately 400 m from the coast. This suggests that small numbers of shorebirds may occasionally travel over land near the coast while moving between daytime foraging and/or roosting sites but generally do not venture further inland. This is consistent with trends observed during spring migration diurnal watch count surveys.

Raptor activity was highest inland at DWC5, near Loon Lake, where 13 individuals were observed. Bald eagle, sharp-shinned hawk (*Accipiter striatus*), and American kestrel were the most abundant raptor species. Raptor activity was relatively low at New Harbour Estuary (DWC1), where only small numbers of bald eagle, merlin (*Falco columbarius*), and osprey were observed.

Waterfowl activity was highest at New Harbour Estuary (DWC1), where 269 individuals were observed. American black duck, green-winged teal, and common merganser were the most abundant waterfowl species. Waterfowl activity was relatively low inland, where only small numbers of American black duck and common loon were observed.

Most birds observed in flight were flying at heights of 50 m or less (85%) or between 50 m and 100 m (14%), with only around 1% flying at heights greater than 100 m. Birds flying at heights greater than 100 m were either raptors or corvids, while passerines, shorebirds, and waterfowl primarily flew at heights below 50 m. Further analysis of flight heights observed using remote sensing technologies is provided in section 10.4.6 and Appendix O.

2023 Fall Migration Surveys - Probable and Confirmed Breeding Evidence

Breeding evidence can be observed after the core breeding season ends, particularly for birds that arrive later to their breeding grounds or those who lay more than one clutch of eggs. Observations of probable and confirmed breeding evidence, based on the MBBA (MBBA, 2006) include:

- Confirmed breeding evidence (recently fledged young): Red-breasted merganser and sharp-shinned hawk.

Avian Incidental Results

Incidental observations were collected by birders when notable species were encountered while travelling between designated survey locations, and by staff conducting various other field programs between 2023 and 2025. A total of 114 individuals were observed incidentally, representing 47 different species (Tables 16 and 17, Appendix N).

The most frequently recorded species:

- Pine siskin
- Boreal Chickadee
- Black-capped chickadee
- Common nighthawk
- Olive-sided flycatcher

Avian SOCI observed:

- American kestrel (1)
- Black-backed woodpecker (1)
- Boreal chickadee (10)
- Canada jay (5)

Avian SAR observed:

- Canada warbler (3)
- Common nighthawk (8)
- Olive-sided flycatcher (6)

The Canada warbler observations were made in treed swamps within the Study Area in June 2023 and consisted of one singing male and one probable breeding pair. The singing male was observed in a wetland outside of the Assessment Area, while the pair was observed in a wetland within the Assessment Area.

The common nighthawk observations were made in open habitats (e.g. open wetlands and harvested areas) throughout the Study Area in July and August 2024 and represent individuals that were flying and/or foraging overhead. The olive-sided flycatcher observations were made in open habitats (e.g., open wetlands and harvested areas) between June and August 2024 and consisted of singing and/or calling individuals. Two olive-sided flycatcher observations were associated with wetlands within the Assessment Area, one of which also contained Canada warbler.

10.4.4.3 SAR Detected within or Near the Study Area

A total of 15,444 individual birds were detected within or near the Study Area between the 2023 avian field assessments and incidental observations made during other field programs between 2023 and 2025. A total of 125 species were recorded, six of which are SAR (Table 10.33; Drawing 10.19).

Table 10.33: Avian SAR Detected Within or Near the Study Area

Common Name	SAR Status	Year and Season	Total Observed
Barn swallow	SARA: Threatened ESA: Endangered S-Rank: S3B	Spring 2023 Fall 2023	15
Canada warbler	SARA: Threatened ESA: Endangered S-Rank: S3B	Spring 2023 Summer 2023 and 2024	23
Common nighthawk	SARA: Special Concern ESA: Threatened S-Rank: S3S4B	Summer 2023 and 2024	15
Olive-sided flycatcher	SARA: Special Concern ESA: Threatened S-Rank: S3B	Spring 2023 Summer 2023 and 2024	13
Peregrine falcon	SARA: N/A ESA: Vulnerable S-Rank: S1B, S3M	Fall 2023	2
Rusty blackbird	SARA: Special Concern ESA: Endangered S-Rank: S2S3B	Spring 2023	1

Canada warbler was the most common avian SAR within the Study Area. Canada warbler, olive-sided flycatcher, and rusty blackbird are wetland dependent species and were generally observed within or near wetland habitats. Canada warbler and olive-sided flycatcher were primarily observed during the breeding season, although several individuals were also observed during spring migration surveys. Rusty blackbird was observed once during spring migration surveys in mid-May; however, this observation falls within the active breeding season for this species (ECCC, 2015a; MTRI, n.d.), which begins earlier than the other SAR observed.

Common nighthawk is also presumed to breed within the Study Area based on the results of the targeted nightjar surveys and several incidental observations. Neither barn swallow nor peregrine falcon were observed during the breeding season and these species were presumably utilizing the Study Area as migratory and/or foraging habitat.

10.4.5 Avian Species at Risk Habitat Modelling

10.4.5.1 *Avian Species at Risk Habitat Modelling Methods*

Habitat modelling was completed to provide an evaluation of habitat availability and habitat loss for avian SAR that were observed during field surveys or that are likely to occur near the Project. Habitat preferences for each species were used to create models in ArcGIS Pro, which were then used to estimate the abundance of suitable habitat. The model criteria for each species are as follows:

Barn Swallow

This species forages over a wide range of open and semi-open habitats, including natural and anthropogenic environments, and often nests on anthropogenic structures. Buildings (e.g., houses, camps, sheds, garages, barns) and bridges were identified and buffered 600 m to allow for their respective foraging range.

Canada Warbler

To account for moist forests with a dense, deciduous shrub layer, complex understory, and available perch trees, the NSECC WAM GIS layer (NSECC, 2022c) was filtered to include values up to 0.5 m depth to water. The NSNR forestry GIS inventory data (NSNR, 2021f) was queried to include the FORNON code 39, which are areas where alders (*Alnus* spp.) comprise 75% or more of the total canopy. Records where the leading species (SP1) was indicated as tamarack (*Larix laricina*), red maple, balsam fir, and black spruce were included in the model. Stands including larch as the second or third most abundant species were also included. To account for wetland features and their respective edge habitat, all wetlands from the Canadian Wetland Inventory (CNWI) data (ECCC, 2024a) were included. These methods are consistent with habitat requirements outlined in the document ECCC Recovery Strategy for the Canada Warbler (*Cardellina canadensis*) in Canada (2016b).

Common Nighthawk

Open ground and/or clearings for nesting (e.g., sandy areas, open forests, grasslands, wetlands, barrens, and other rocky areas) were considered from the land cover classification. A

10 m buffer was included on the road network, including unpaved forestry roads [Government of Nova Scotia's Topographic Database (GeoNOVA, 2024c)], to account for push up topography features from past road construction. The CNWI was filtered to include only open wetland types (e.g., bog, bog or fen, fen, marsh). The land cover types of 'Urban, Landfill, Quarry, Transport Corridor', 'Utility Corridor', or 'Blueberries or Barren' were queried. These methods are consistent with habitat requirements outlined in the document ECCC Recovery Strategy for the Common Nighthawk (*Chordeiles minor*) in Canada (2016c).

Olive-sided Flycatcher

The forest inventory data was filtered to select for stands where the leading species attribute included any of the following species:

- Black spruce
- Red spruce
- White spruce
- Scots pine
- Red pine
- Jack pine
- Eastern hemlock (*Tsuga canadensis*)

The archived Crown harvest plans and harvest land cover class received a 20 m internal buffer to include only edge habitat. All wetlands were included from the CNWI data. Burn data was also included as habitat in the analysis. A large burn area from 2020 intersects the Study Area.

Further filtering the leading species attribute field to a height greater than 12 m was not completed due to the resulting significant habitat loss. These methods are consistent with habitat requirements outlined in the document ECCC Recovery Strategy for the Olive-sided Flycatcher (*Contopus cooperi*) in Canada (2016).

Rusty Blackbird

Forest inventory data was filtered based on potential wet softwood forests (e.g., fir and all spruce near water bodies or wetlands). To capture wet areas containing the softwood species specified and potential softwood dominated treed swamps, the forestry data was intersected with wet areas mapping of 50 cm or less and the Canadian Nation Wetland Inventory database. Forest stands flagged with breeding evidence were included.

10.4.5.2 Avian SAR Habitat Modelling Results

The habitat models were used to calculate the amount of predictive habitat for each species within the Clearing Footprint, Study Area, and a 5 km buffer of the Study Area (Table 10.34).

Table 10.34: Potential Avian SAR Habitat within Various Spatial Boundaries

Species	Clearing Footprint		Study Area		5 km of the Study Area	
	ha	%	ha	%	ha	%
Barn swallow	45	2.6	1,456	6.6	16,555	21.7
Canada warbler	331	19.3	6,396	29.0	15,343	20.1
Common nighthawk	695	40.5	6,050	27.4	14,779	19.4
Olive-sided flycatcher	47	2.7	2,951	13.4	6,885	9.0
Rusty blackbird	86	5.0	1,525	6.9	3,743	4.9

Calculations based on a Clearing Footprint of 1,716.1 ha, Study Area of 22,055.9 ha, and 5 km buffer of 76,290.3 ha.

Drawings 10.14 to 10.18 show the results of the habitat modelling for each species

Barn swallow nests primarily on human-made structures, and no negative Project-related impacts to their nesting habitat are anticipated. Some loss of foraging habitat (e.g. open areas, wetlands, etc.) may occur. Of the 16,555 ha of predictive barn swallow habitat within a 5 km buffer of the Study Area, 45 ha (0.27%) overlaps with the Clearing Footprint. This amount consists of foraging habitat, as no suitable structures for nesting are present within the Clearing Footprint. While this species had the most predicted habitat within 5 km, the proportion anticipated to be impacted by the Project was the smallest of the five species modelled.

Canada warbler nests in a variety of shrubby and treed wetlands. This species is often associated with wet, mixedwood forest with a well-developed deciduous shrub layer (COSEWIC, 2020). Of the 15,343 ha of predictive Canada warbler habitat within a 5 km buffer of the Study Area, 331 ha (2.2%) overlaps with the Clearing Footprint. This species had the second highest amount of predicted habitat within 5 km; however, the proportion anticipated to be impacted by the Project is relatively low.

Common nighthawk nests primarily in open habitats with bare ground (e.g. clearcuts, fields, rock outcrops, barrens, open wetlands, etc.) (COSEWIC, 2018a; NSNR, 2021i). Forestry activity within the Study Area has created open habitat that may be suitable for common nighthawk. Due to the Project's proximity to the coast, barrens, bogs, and rocky terrain are also abundant and may offer suitable nesting habitat. Of the 14,779 ha of predictive common nighthawk habitat with a 5 km buffer of the Study Area, 695 ha (4.7%) overlaps with the Clearing Footprint. Common nighthawk was the species with the highest proportion of predicted habitat to be altered by the Project; however, it is possible that clearing associated with the Project could increase the amount of suitable breeding habitat for this species.

Olive-sided flycatcher typically nests in open habitats such as open wetlands (i.e. bogs, fens, riparian areas), and near forest edges with coniferous trees and tall trees and/or snags for perching (COSEWIC, 2018b). Of the 6,885 ha of predictive olive-sided flycatcher habitat within a 5 km buffer of the Study Area, 47 ha (0.68%) overlaps with the Clearing Footprint.

Rusty blackbird nests in wetlands and riparian areas that typically feature open water and are surrounded by coniferous or mixedwood forest (COSEWIC, 2006). Of the 3,743 ha of

predictive rusty blackbird habitat within a 5 km buffer of the Study Area, 86 ha (2.3%) overlaps with the Clearing Footprint. Rusty blackbird was the species with the least predicted habitat within 5 km, and the proportion anticipated to be altered by the Project is relatively low.

The results of the habitat modelling show that local habitat loss for avian SAR should be low, and that the amount of suitable habitat within the Clearing Footprint is low relative to the amount of suitable habitat present within a 5 km buffer of the Study Area. The species with the highest potential for habitat loss based on the results of this analysis is common nighthawk. The habitat types favoured by this species have often been heavily disturbed (open areas, clearcuts, etc.), and the Project has prioritized the use of these areas to minimize impacts to more intact and/or ecologically significant habitats. It is possible that clearing for the Project could result in the creation of new common nighthawk habitat.

10.4.6 Remote Sensing

10.4.6.1 *Remote Sensing Methodology*

Avian Radar System

Avian radar assessments were undertaken during the spring and fall 2023 migratory periods. The objective of the avian radar assessment was to assess migratory bird activity in the airspace above the Study Area. An avian radar system (ARS) was deployed in the southern portion of the Study Area near the community of Tor Bay (Drawing 10.20) between April 4 and November 17, 2023. This location provided a good line of sight into the airspace above the Project, southern exposure for solar charging, sufficient cellular and satellite coverage for remote communications, and accessibility for spot checks. The ARS was mounted off the ground to minimize ground noise interference and lessen the impacts of local microtopography on data collection and quality. Since most birds migrate nocturnally, the ARS was programmed to collect data between sunset and sunrise.

The ARS was a Simrad Halo 6 pulse compression marine surveillance radar was employed and angled diagonally at 45° above the horizon. The ARS consists of two x-band pulse compression surveillance radars oriented to scan the airspace approximately 50 m to 3,000 m above the Project. The diagonal orientation allowed for a 150° scan of the airspace above the ARS, while the 210° below the radar is blanked. The diagonal orientation also allows for the calculation of the height of any potential avian target.

The ARS was deployed with an off grid 12V system that was designed for optimal active monitoring and specificity in deployment. It was designed to charge and store energy using solar panels and a battery bank, while also powering the radar and associated equipment for data collection and remote communications. The system in its entirety is designed to be mobile, so the movement of the ARS was possible throughout a season, if needed.

Avian radar scans were processed using the radR platform – an open-source platform designed for the processing of radar data for biological applications – and outputs were

analyzed using Microsoft Excel (P. Taylor et al., 2010). Standard settings for the identification of biological targets (BT), such as birds, and bats were used. Targets reflected by the radar generate blips in the image of the radar scan. radR helps filter sequential images of radar scans to identify blips that occur in the same area over at least four out of five scans. Should these constraints be met, a target is generated. BTs are most likely generated by birds, but could also be bats and insects, or even drones and planes. Weather occurrences, such as fogs, rain, and low cloud cover, may cause interference with the radar (similarly to weather radar), which lowers the effectiveness of the system and reduces the reliability of the system's ability to detect birds. As such, data was excluded from the analysis when the minimum hourly rainfall exceeds 0.5 mm. Rainfall data was obtained from ECCC's Hart Island Weather Station (ECCC, 2025d).

Data analysis of radar results focused on assessing the number of targets moving through the Study Area and at what heights flyovers occurred, especially during the migration seasons. Assessment of migratory cues were also conducted to visualize potential weather and climatic conditions (i.e., wind speed, wind direction, temperature, lunar cycle) that may influence migratory patterns. Data analysis also assessed migratory bird density at various height bins comparable with altitudinal heights to demonstrate potential target interactions with turbines.

Detailed methods are provided in Appendix O.

Acoustic Assessment

One autonomous recording unit (ARU) was deployed within the Study Area between April 4 and November 17, 2023, to assess the activity of birds migrating nocturnally over the Project. The ARU, labelled NHBird1, was deployed in the southern portion of the Study Area alongside the avian radar system (Drawing 10.20).

During the 2023 monitoring period, the ARU experienced a technical malfunction that significantly reduced sound quality, making distinguishing avian targets from background noise difficult. To address this data gap, acoustic data from a monitor deployed near England's Lake for the Setapuktuk Wind Project was included to supplement results. The England's Lake monitoring location is approximately 37.5 km from NHBird1 and 24.6 km from the nearest Study Area Boundary (Drawing 10.20). This ARU, labelled ELBird1, collected data between May 25 and November 22, 2023.

Audio recordings from the ARU were run through Nighthawk, a machine learning model that specializes in the detection and classification of avian nocturnal flight calls. The output files were then manually verified by Strum environmental scientists, to assess the accuracy of the model.

Manual verification was completed using Raven Pro, a computer program specializing in the visualization and analysis of sounds. The scientists listened to approximately 30 vocalizations (or all vocalizations if fewer than 30 were detected) for each species identified by Nighthawk. The vocalizations were annotated 'Y' if the species-level identification made by the model was correct, or 'N' if the identification was incorrect.

Detailed methods are provided in Appendix O.

10.4.6.2 Remote Sensing Results

Radar Results

Data collected by the ARS during the 2023 monitoring period was analyzed to provide the number of biological targets (nBTs) by date, time, height and by migratory cue. Data was also analyzed to determine target density within height bins and the percentage of potential targets within the rotor swept area (i.e., risk zones of turbine interaction). A snapshot of radar results is provided below and detailed results can be found in Appendix O.

The ARS detected 14,108 BTs throughout the entirety of the 2023 monitoring period (Figure 10.3)

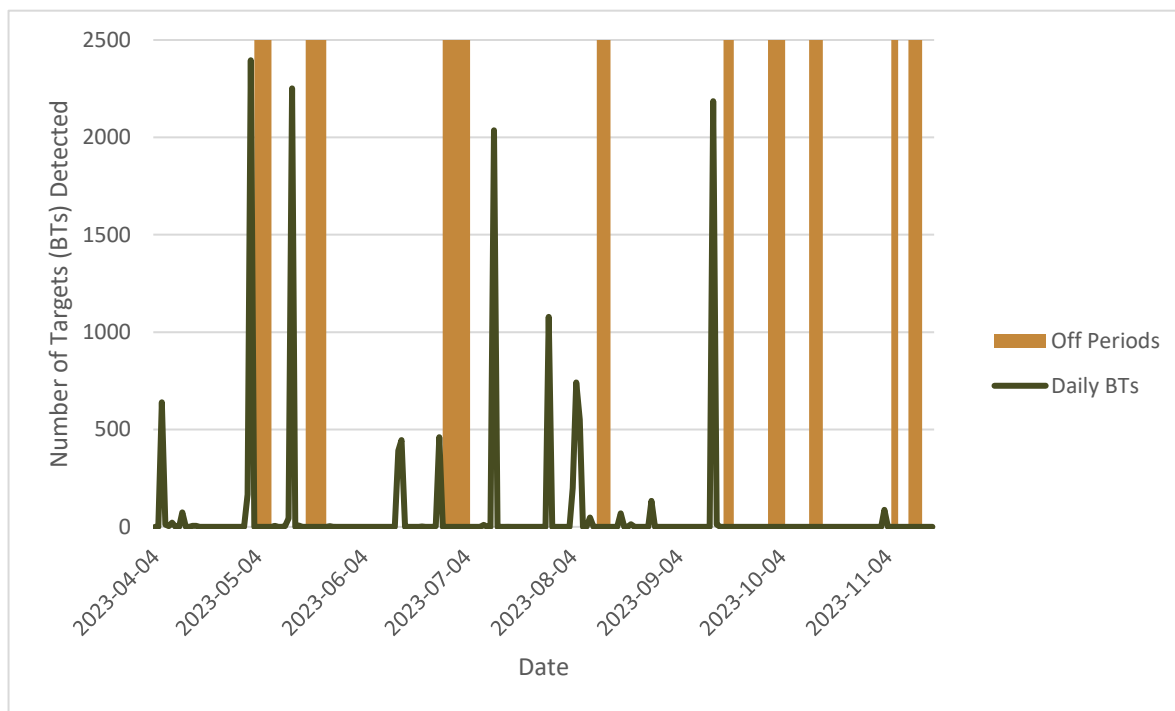


Figure 10.3: Number of BTs detected throughout the 2023 Monitoring Period

A total of 5,639 BTs were detected during the 2023 spring monitoring period, with detections peaking on April 6 (nBTs = 640), May 2 (nBTs = 2,396), and May 14 (nBTs = 2,251). Most BTs (98%) were detected at heights between 500 m and 2,000 m, with approximately 49% occurring between 1,000 m to 1,500 m.

A total of 3,349 BTs were detected during the 2023 summer monitoring period, with detections peaking on June 14 (nBTs = 392), June 15 (nBTs = 445), June 26 (nBTs = 461), and July 12 (nBTs = 2,036). Most BTs (91%) were detected at heights between 500 m and 2,000 m, with approximately 41% occurring between 500 m and 1,000 m.

A total of 5,120 BTs were detected during the 2023 fall monitoring period, with detections peaking on July 28 (nBTs = 1,079), August 5 (nBTs = 742), August 6 (nBTs = 551), and September 14 (nBTs = 2,185). Most BTs (96%) were detected at heights between 500 m and 2,000 m, with approximately 46% occurring between 1,000 m and 1,500 m.

Table 10.35 summarizes the number of detections made per season, and their respective height bins.

Table 10.35: Number of BTs Detected per ARS Height Bin During the 2023 Monitoring Period

Range bin (m)	Number of Targets Detected (Spring)	Number of Targets Detected (Summer)	Number of Targets Detected (Fall)
0-25	0	0	0
25-50	0	0	0
50-100	0	0	0
100-150	24	1	1
150-200	7	20	9
200-250	6	26	21
250-500	50	256	176
500-1000	1,794	1,356	1,722
1000-1500	2,751	1,230	2,372
1500-2000	1,007	460	819
2000-3000	0	0	0
Total	5,639	3,349	5,120

Timing of Migratory Movement

The ARS was active between sunset and sunrise throughout the 2023 monitoring period. During spring, most BTs (79%) were detected from approximately 00:00 to 04:00. During summer, most BTs (72%) were detected from approximately 02:00 to 06:00. During fall, most BTs (69%) were detected from approximately 18:00 to 23:00, with high numbers also detected from 05:00 to 06:00.

Figure 10.4 summarizes the timing of detections made throughout the 2023 monitoring period.

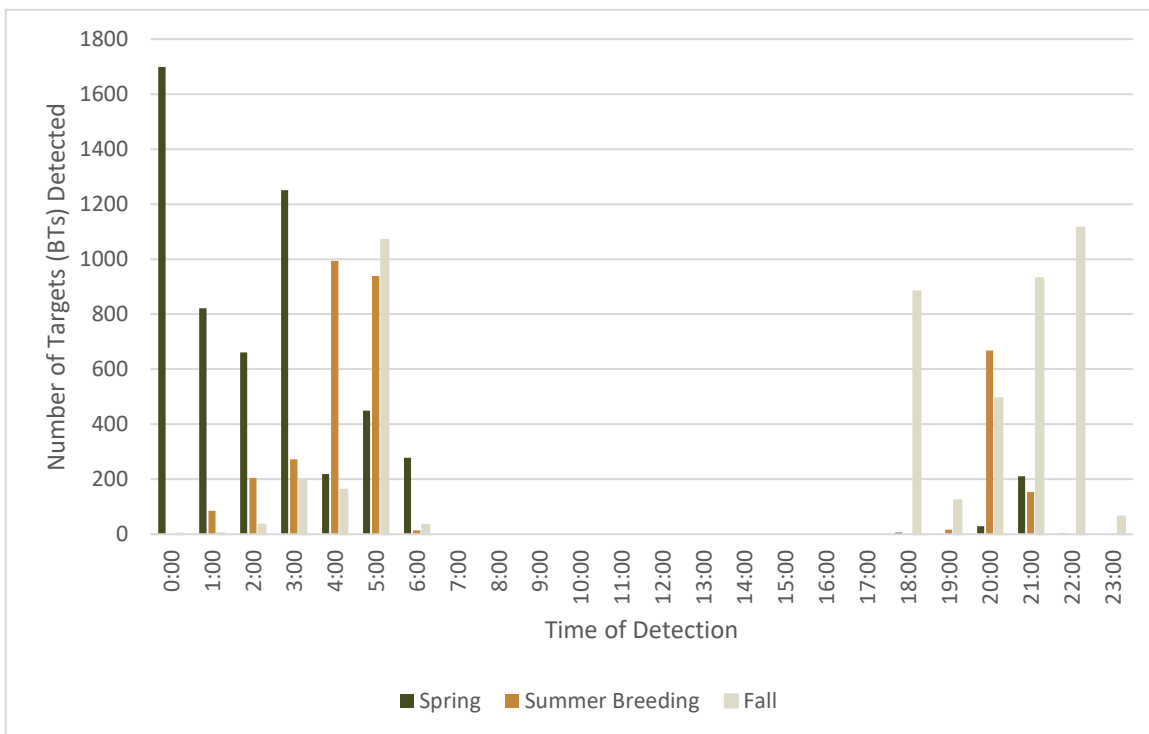


Figure 10.4: Timing of BT Detections Throughout the 2023 Monitoring Period

Target Density

ARS target density was calculated using the number of targets detected during the 2023 monitoring period and the volume of airspace scanned within each height bin.

During spring 2023, target density was relatively similar to target count, with target density increasing above 200 m and peaking in the 1,000 m to 1,500 m range bin. Target density within the 100 m to 150 m height bin was higher during spring than during summer or fall but was still relatively low. Similar to target count, target density decreased above 1,500 m but remained higher than what was detected in the lower height bins.

During summer 2023, target density was similar to target count, with target density increasing above 200 m, and peaking in the 500 m to 1,000 m range bin. Similar to target count, target density decreased above 1,000 m but remained higher than what was detected in the lower height bins.

During fall 2023, target density was similar to target count, with target density increasing above 200 m, and peaking in the 1,000 m to 1,500 m range bin. Similar to target count, target density decreased above 1,500 m but remained higher than what was detected in the lower height bins.

Table 10.36 provides a summary of target density calculations for the 2023 monitoring period.

Table 10.36 Target Density – All Seasons

Range Bin	Target Density (BT/km ³) (Spring)	Target Density (BT/km ³) (Summer Breeding)	Target Density (BT/km ³) (Fall)
0-25	0.00	0.00	0.00
25-50	0.00	0.00	0.00
50-100	0.00	0.00	0.00
100-150	117.47	4.89	4.89
150-200	34.11	97.47	43.86
200-250	29.08	126.03	101.79
250-500	47.53	243.35	167.30
500-1000	805.93	609.16	773.58
1000-1500	1,177.15	526.32	1,014.98
1500-2000	415.09	189.61	337.59
2000-3000	0.00	0.00	0.00

Avian Interactions with the Project

Based on the height and rotor diameter of the proposed turbine model, birds flying at heights between 38 m and 221 m would be at potential risk of interacting with Project infrastructure; this range is also referred to as the rotor swept area. The number of BTs detected within or above the rotor swept area during the 2023 monitoring period is shown in Figure 10.5.

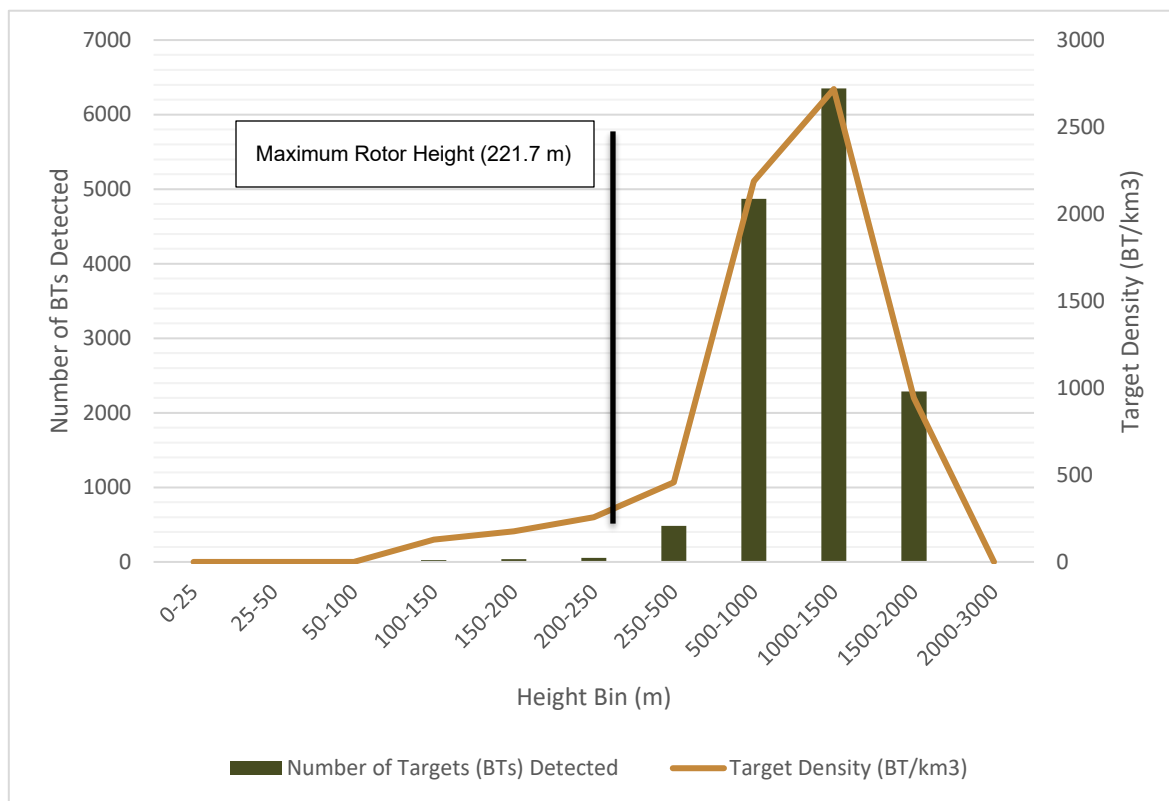


Figure 10.5: Number of Detections Within or Above the Rotor Swept Zone During the 2023 ARS Monitoring Period

During the 2023 monitoring period, most BTs (approximately 99%) were detected outside of the rotor swept area. The number of targets within the rotor swept area peaked on April 9 (nBTs = 21), July 12 (nBTs = 19), and September 14, 2023 (nBTs = 21). Each of those days were days when the number of BTs detected above the rotor swept area also peaked. In total, 115 BTs were detected within the rotor swept area, which accounts for approximately 1% of the BTs detected during the 2023 monitoring period.

Acoustic Monitoring Results

Data collected by the ARU during the 2023 monitoring period was analyzed to provide peak detection periods and presence of species within or near the Study Area. A snapshot of the acoustic monitoring results is provided below, and detailed results can be found in Appendix O.

ELBird1

The Nighthawk model made a total of 24,766 detections from the ELBird1 data during the 2023 monitoring period, the majority of which occurred in May (18%), June (54%), and September (20%). Most of the detections occurred between 21:00 and 05:00, with the highest number of detections occurring in the morning between 03:00 and 04:00 and in the evening between 23:00 and 00:00.

A subset of 2,479 detections was manually verified by Strum environmental scientists, and of those, 508 (20%) were correctly identified by Nighthawk. Most of the positive detections during spring and summer occurred in June (8%) and most of the positive detections during fall occurred in September (69%) followed by October (16%). The correct detections represented 26 different species (Table 10.37).

Table 10.37: Summary of Species Correctly Identified by Nighthawk during the 2023 ELBird1 Monitoring Period

Common Name	Scientific Name	COSEWIC Status	SARA Status	ESA Status	NS S-Rank
American Pipit	<i>Anthus rubescens</i>	-	-	-	S4M
American Redstart	<i>Setophaga ruticilla</i>	-	-	-	S5B
American Robin	<i>Turdus migratorius</i>	-	-	-	S5B, S5N
Black-and-White Warbler	<i>Mniotilta varia</i>	-	-	-	S5B
Canada Warbler	<i>Cardellina canadensis</i>	Special Concern	Threatened	Endangered	S2S3B
Cape May Warbler	<i>Setophaga tigrine</i>	-	-	-	S3S4B, S4M
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	-	-	-	S5B
Chipping Sparrow	<i>Spizella passerine</i>	-	-	-	S4B
Common Yellowthroat	<i>Geothlypis trichas</i>	-	-	-	S5B
Dark-eyed Junco	<i>Junco hyemalis</i>	-	-	-	S5
Greater Yellowlegs	<i>Tringa melanoleuca</i>	-	-	-	S3B, S4M
Gray-cheeked Thrush	<i>Catharus minimus</i>	-	-	-	SUB
Hermit Thrush	<i>Catharus guttatus</i>	-	-	-	S5B
Least Sandpiper	<i>Calidris minutilla</i>	-	-	-	S1S2B,S2S4M
Mourning Warbler	<i>Geothlypis Philadelphia</i>	-	-	-	S4B
Northern Parula	<i>Setophaga americana</i>	-	-	-	S5B
Nashville Warbler	<i>Leiothlypis ruficapilla</i>	-	-	-	S4B,S5M
Northern Waterthrush	<i>Parkesia noveboracensis</i>	-	-	-	S5B
Ovenbird	<i>Seiurus aurocapilla</i>	-	-	-	S5B
Palm Warbler	<i>Setophaga palmarum</i>	-	-	-	S5B
Savannah Sparrow	<i>Passerculus sandwichensis</i>	-	-	-	S4B,S5M
Semipalmated Plover	<i>Charadrius semipalmatus</i>	-	-	-	S1B, S3S4M
Spotted Sandpiper	<i>Actitis macularius</i>	-	-	-	S4B
Swainson Thrush	<i>Catharus ustulatus</i>	-	-	-	S4B, S5M
White-throated Sparrow	<i>Zonotrichia albicollis</i>	-	-	-	S4S5B,S5M
Wilson's Warbler	<i>Cardellina pusilla</i>	-	-	-	S3B, S4M

Source: (ACDC, 2026b)

Nighthawk was most successful at detecting American robin, Canada warbler, Cape May warbler, hermit thrush, mourning warbler, white-throated sparrow, and Wilson's warbler (*Cardellina pusilla*); all of which had a success rate of 90% or higher when a sample of detections was manually verified.

SOCI detected by ELBird1:

- Greater yellowlegs (28)
- Semipalmated plover (2)
- Cape May warbler (1)
- Least sandpiper (1)
- Wilson's warbler (1)

Least sandpiper, semipalmated plover, and greater yellowlegs were detected almost entirely in the fall, suggesting the movement of migrating shorebirds through the England's Lake area at that time. A single SAR, Canada warbler, was detected on September 15, 2023, migrating nocturnally over ELBird1.

Based on the proximity between ELBird1 and the Study Area (24.6 km), the avian species diversity recorded by this monitor is presumed to be representative of the species diversity that migrates over the Study Area.

10.4.7 Effects Assessment

Project-Avifauna Interactions

Project activities, primarily those that involve earth moving or vegetation removal, or turbine interactions with avifauna in the airspace have the potential to impact avifauna (Table 10.38). These activities could result in habitat removal, edge effects, reductions in food availability, and avifauna-turbine interactions (i.e., sensory disturbance, injury, or mortality). Other Project related activities, including during construction and operation, may impact avifauna behaviours, such as increased traffic and noise.

Table 10.38: Potential Project-Avifauna Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X

Project Phase	Potential for Interaction
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

For the purposes of this assessment, the LAA for avifauna includes a 5 km buffer of the Study Area (Drawing 10.21) as well as the airspace that is directly surrounding the turbines to account for the rotor swept area (i.e., risk zone). The RAA is the boundaries of ecoregions that interest the Study Area, bounded by mainland Nova Scotia and the St. Mary's River. This area was selected to support the assessment of cumulative effects (Section 16.4).

Assessment Criteria

Assessment criteria provided in Section 4.3 also apply for avifauna. The VC-specific definition for magnitude is as follows:

- Negligible: No loss of avifauna habitat, no sensory disturbance impacts, and injuries or mortalities to avifauna are not expected.
- Low: Small loss of habitat supporting SAR and habitat sensitive avifauna, low sensory disturbances, and low risk of injuries and mortalities.
- Moderate: Moderate loss of habitat supporting SAR and habitat sensitive avifauna, moderate sensory disturbances, and moderate risk of injuries and mortalities on individual level rather than entire populations.
- High: High loss of habitat supporting SAR and habitat sensitive avifauna, high sensory disturbances, and high risk of injuries and mortalities that would be sufficient to impact species on a population scale.

Effects

Project activities may have the following impacts on avifauna:

- Habitat loss, fragmentation, and edge effects
- Sensory disturbance (i.e. lighting and noise)
- Injury and mortality

Habitat Loss

Habitat loss is considered one of the biggest threats to bird populations and a key driver behind population declines observed across Canada in recent decades (Birds Canada & ECCC, 2024). This assessment uses an estimate of 1,716 ha of clearing (the Clearing Footprint) to evaluate habitat impacts; however, much of the area cleared represents a temporary impact that will be allowed to revegetate following construction. The Project will include up to 158 turbines, with each turbine pad measuring approximately 100 m x 100 m. The Project also includes 223 km of roads, 129 km (58%) of which will be newly constructed and 94 km (42%) of which are existing. The Project Footprint has maximized the use of existing roads, which will decrease the amount of habitat loss associated with road construction.

The most abundant habitat types within the Study Area are open areas (26%), softwood forest (24%), and cutover upland (13%). These are also the most abundant habitat types within the Clearing Footprint and are expected to account for approximately 75% of the area to be cleared. The greatest overall impact will occur in open areas (36%), which include barrens and disturbed areas. Harvested lands and disturbed areas were prioritized for the siting of Project infrastructure, where possible, to minimize habitat loss.

Impacts to wetlands, which can provide valuable habitat for avifauna (including several avian SAR), are expected to be low. Approximately 46 ha of field delineated and predicted wetland within the Assessment Area, predominantly treed and/or shrub swamp, may require alteration permitting. This represents approximately 0.5% of the wetland habitat available within the LAA based on land cover modelling, which suggests that wetland habitat will remain locally abundant. Three wetlands within the Assessment Area were found to support avian SAR: one containing Canada warbler, one containing olive-sided flycatcher, and one containing both species. One of these wetlands is outside of the Clearing Footprint and is not anticipated to be impacted. The other two wetlands are expected to require partial alterations that would affect approximately 25% of their total area.

Avian Species at Risk Habitat Modelling

Avian SAR habitat modelling was completed to identify potential habitat for barn swallow, Canada warbler, common nighthawk, olive-sided flycatcher, and rusty blackbird (Drawings 10.14 to 10.18).

Predicted habitat within the LAA with potential to be impacted by the Project was low, ranging from 0.27% to 4.7%. Common nighthawk, which prefers open, disturbed habitats, was the species with the highest proportion of predicted habitat anticipated to be impacted by the Project. This result was expected, as the Project prioritized the use of disturbed areas (e.g. clearcuts) to minimize impacts to more intact, ecologically significant habitats. However, suitable breeding habitat is anticipated to increase for common nighthawk due to their affinity for open, disturbed habitats.

Predicted habitat loss was lowest for barn swallow, with potential impacts to 0.27% of the 16,555 ha of predicted habitat within the LAA. Clearing for the Project would primarily impact

foraging habitat, with no impacts to potential nesting structures (buildings, bridges, etc.) anticipated.

While Canada warbler, olive-sided flycatcher, and rusty blackbird are all wetland dependent species, their modelling results varied due to differences in specific habitat preferences (e.g. wetland type and dominant vegetation type), and the relative abundance of each habitat type.

Of these three species, Canada warbler, which prefers treed swamps and shrub swamps, had the highest amount of predicted habitat within the LAA (15,343 ha) with approximately 2.2% anticipated to be impacted by clearing for the Project. Canada warbler was also the most abundant avian SAR encountered during avian field surveys (and incidentally during other field programs), with 23 observations made between 2023 and 2025.

Rusty blackbird, which prefers coniferous open water wetlands, was the species with the smallest amount of predicted habitat within the LAA (3,743 ha), with a similar proportion (2.3%) anticipated to be impacted.

Olive-sided flycatcher, which prefers open wetlands and edge habitats, had 6,885 ha of predicted habitat within the LAA, with a smaller proportion (0.68%) anticipated to be impacted. Foraging habitat for olive-sided flycatcher may increase as this species utilizes edge habitat and clear-cuts for foraging, though these habitats may be lower quality. Robertson & Hutto (2007) found that nesting success in olive-sided flycatcher was twice as high when the birds nested in naturally occurring habitats (e.g. open wetlands) compared to human-influenced habitats (e.g. clearcut edges).

The avian SAR habitat modelling results suggest that habitat for each of these species is not unique to the Clearing Footprint or Assessment Area and is abundant within the Study Area and LAA.

Based on the avian SAR habitat modelling results, the Project's prioritization of existing road infrastructure, and the prioritization of open or disturbed habitats, overall impacts to avifauna from habitat loss are anticipated to be low.

Habitat Fragmentation

Wind energy projects have been associated with habitat fragmentation due to large road networks typically required to access turbines (Diffendorfer et al., 2019). Habitat fragmentation, defined as the conversion of continuous habitat into small and isolated patches (Meffe & Carroll, 1994) can have a variety of impacts on avifauna, including changes in species composition, nesting success, competition, and predation (Andr n, 1994; Chen & Wang, 2024; Schmiegelow & M nkk nen, 2002).

Habitat fragmentation can influence habitat suitability for avifauna species, leading to changes in species composition within a given area. Habitat fragmentation has been shown to increase the number of habitat generalist species while also decreasing the number of habitat

specialists. Habitat generalists have a higher likelihood of surviving in smaller habitat patches in a mosaic landscape (e.g., a road network associated with a wind project) due to their ability to utilize various habitat patch types (Andrén, 1994). Some bird species (i.e. forest interior birds) occupy large territories and require large, contiguous tracts of habitat. Forest interior species such as American goshawk, black-backed woodpecker, and bay-breasted warbler, which were detected during field studies for the Project, tend to prefer larger, intact habitats and may be more sensitive to changes in habitat continuity. Studies suggest that forest interior or “area-sensitive” bird species occur less frequently in smaller, more isolated habitat patches, and have lower nesting success when they do occur in these habitats (Austen et al., 2001).

Forest interior species such as American goshawk, which occupy particularly large territories, are likely more susceptible to impacts from habitat fragmentation than species which occupy smaller territories. A study conducted in Nova Scotia (Whynot, 1999) found that American goshawks nested in forest stands with an average size of 11.6 ha. When species that require a large territory are displaced by fragmentation, they may have a harder time finding new territories that are large enough and also meet their other habitat requirements. Smaller interior forest birds such as bay-breasted warbler, which are believed to have smaller territory requirements (1.6 to 3.6 ha) (Maine Audubon, 2017), would likely have a higher abundance of suitable alternate habitat patches to move to if displaced by habitat fragmentation.

For many forest interior species, habitat patch size is thought to be the variable that has the greatest influence on reproductive success, (Austen et al., 2001; Burke & Nol, 2000). Burke & Nol (2000) found that nesting success for interior forest birds in Ontario increased significantly as habitat patch size increased. Local forest cover was not found to have a significant impact on nesting success, suggesting that for area-sensitive species, habitat continuity may play a more important role in their success than overall habitat abundance.

Based on the configuration of Project road network (94 km of road upgrades and 129 km of new road development), an increase in road density will occur across the LAA, with the greatest increases concentrated in the southeastern portion of the Study Area where few existing roads are present (Drawing 3.1A to 3.1Q). Since the southeastern portion of the Study Area is largely comprised of open habitat (i.e., barrens), impacts to forest birds in that area would be minimal. Contiguous forest is most abundant in the northern portion of the Study Area; however, existing roads are also more abundant in this area and the increase in habitat fragmentation is expected to be low.

Edge Effects

In addition to the division and isolation of suitable habitat, fragmentation can also cause edge effects, which impact avifauna by altering factors such as environmental conditions, predator behaviour, and food availability. “Edge effects” refer to changes that occur at the transition zone between habitat types (e.g. forest edges), which impact the species and habitats found there. The Project will create new areas of edge habitat when intact forest is cleared during the site preparation and construction phase. Similar to habitat fragmentation, the degree to which avifauna are impacted by edge effects varies depending on the species and specific site conditions.

Edge habitat may alter physical conditions like light, temperature (e.g., higher wind and sun exposure), and wind, which in turn influences vegetation structure and food availability, potentially impacting bird communities (Andrén, 1994). Bird species with different characteristics, such as habitat specialization, reproductive rates, and trophic guilds, may respond differently to edge effects. For example, species that prefer low-light habitats (e.g., larger eyed birds like owls and thrushes) may be more sensitive to edge effects, while other bird species such as insectivores (e.g., flycatchers, swallows, and nightjars) and understory foragers may thrive in fragmented habitats (Andrén, 1994; Tittler et al., 2001). Examples of species that rely on interior-forest habitat, especially with regards to nesting, include certain thrush [e.g., Swainson's thrush and wood thrush (*Hylocichla mustelina*)] and warbler species (e.g., bay-breasted warbler and ovenbird).

While the creation of edge habitat may negatively impact some species, it can also benefit others. For example, the creation of edge habitat and open areas has the potential to attract aerial insectivores. Some bird species benefit from forest edge habitat and have been shown to return in subsequent years after an area is cleared due to the availability of foraging opportunities and other niche habitats (Tittler et al., 2001). Additionally, some species (e.g., blackbirds) can also tolerate forestry activities as long as their habitat of coniferous dominant trees of varied heights near waterbodies is maintained (C. Stacier, avian biologist and professor at Dalhousie University, personal communication 2018). Consequently, cleared areas create open spaces and edges within the forested environment, which may benefit certain bird species that favour edge or transitional habitats. These changes could potentially create favorable microhabitats within the Clearing Footprint, particularly for generalist bird species or those that readily adapt to disturbed environments.

A total of 123.4 ha of intact interior forest is expected to be directly impacted by the Project, with 358.5 ha of new edge habitat created (Drawing 10.4A to 10.4F). Due to the linear nature of road infrastructure, most areas of new edge habitat will be associated with the development of new roads and upgrades to existing roads. Impacts on avifauna from increased edge effects are anticipated to be low, as less than 0.5% of the LAA will be impacted by the creation of new edge areas. The Project's prioritization of existing road infrastructure has reduced the amount of new edge area that will be created. Furthermore, approximately 9,871 ha of intact interior forest habitat was identified within the LAA, which could provide alternative habitat for interior forest birds displaced by the increase in edge habitat created by the Project.

Summary

Within the Clearing Footprint, habitat loss, fragmentation and increased edge areas may have the following effects:

- Increase in the number of habitat generalist species
- Decrease in the number of habitat specialist species
- Increase in aerial insectivores/foraging habitat
- Increase in transitional and microhabitats
- Increase in suitable habitat for common nighthawk and olive-sided flycatcher (SAR)

- Decrease in suitable habitat for Canada warbler and rusty blackbird (SAR)
- Increased avian predation

Overall, while habitat loss, fragmentation, and edge effects have the potential to negatively impact avifauna, the Project's prioritization of open and disturbed habitats, and the use of existing road infrastructure where practicable, will reduce these impacts. The largest increase in road density will occur in open and disturbed habitats, which tend to support more habitat generalists and fewer habitat specialists (including SAR). These areas include already altered landscapes as well as areas with no existing tree cover. Project activities in these areas are not expected to result in a full conversion of habitat type, but rather a localized and incremental modification within the existing landscape conditions. Some species may also benefit from new habitats created by clearing activities, and overall habitat functionality across the LAA is expected to remain intact.

Sensory Disturbance – Light and Noise

Construction and operation activities for the Project including increased traffic, noise, and lighting have the potential to disturb bird species within the LAA.

Sensory disturbance may occur during all Project phases, though it will be more prevalent during construction (limited to daylight hours, when practicable, during construction), with limited disturbance through operations (i.e., consistent and sporadic noise and lighting generated by traffic and facility operations). The noise and light will be concentrated in the Study Area but could also extend beyond it into the portions of the LAA that are near the Project Footprint.

Increased movement of vehicles could lead to short-term displacement of birds, particularly ground-nesting or low-flying species within proximity to access routes. Traffic disturbance can be particularly stressful for species with established territories within the area, potentially prompting them to abandon nests or avoid otherwise suitable habitat. Overall, while these construction-related disturbances are temporary, they may cause localized changes in bird distribution and behaviour during the active phases of the Project.

Noise from heavy machinery and equipment can disrupt normal behaviours such as foraging, breeding, and resting, especially for sensitive species documented during breeding bird surveys. The sounds associated with construction, while temporary, may lead some birds to avoid areas near active construction zones, possibly altering their habitat use patterns during critical breeding or migration periods (Blickley & Patricelli, 2010; Marler et al., 1973; Shannon, Crooks, et al., 2016).

Birds can exhibit greater susceptibility to noise impacts as many species rely on vocal communication (Blickley & Patricelli, 2010). Avifauna may be displaced from areas adjacent to the Project due to construction related noise. Impacts can also differ between acute and chronic noise sources. Chronic exposure may degrade auditory cues, feedback, and vocal development over time, which are important for predator/prey detection, communication,

breeding, and orientation (Blickley & Patricelli, 2010; Marler et al., 1973; Shannon, Crooks, et al., 2016). A direct physiological impact causing a temporary decrease in auditory sensitivity can occur at acute noise levels above 93 dBA, while permanent damage to avian auditory systems is not recorded until 125 dBA to 140 dBA (Blickley & Patricelli, 2010). In one study, chicks exposed to 111 dBA for 48 hours were found to completely recover from hearing damage within 10 days (Saunders & Tilney, 1982). Ryals et al. (1999) found that birds lose hearing from hair cell loss and that these hairs can recover via regeneration allowing birds to regain hearing.

Certain bird species may not be impacted by sensory disturbances. A study of the impact of logging truck traffic on birds reported no observed effects on nesting at noise levels of 53 dBA (Grubb et al., 1998). It was also found that noise-tolerant species had increased nesting success and decreased nest predation through higher awareness and less flushing (Francis et al., 2009). The median sound level produced by construction equipment at 15 m from point source is comparable to sound produced from an ATV or pick-up truck (96 dBA), which is already a common source of sound within the Study Area, as are logging trucks and harvesting equipment. Therefore, impacts to auditory sensitivity may occur from acute noise on a short term and intermittent frequency during the construction phase. The decibel limits of individual construction equipment required for the Project are not expected to be greater than 115 dBA, indicating permanent damage to avian auditory systems is not likely to occur. Blasting noise (if blasting is deemed necessary) may exceed this range but this activity will be sporadic in nature, only occurring during the construction phase of the Project. A Blasting Management Plan and mitigation measures will be developed to lessen impacts during blasting if it is required.

A literature review conducted by Shannon et al. (2016) found that noise levels greater than 45 dBA have the potential to exhibit changes in avian song characteristics, reproduction, abundance, stress levels, and species richness. Sensory disturbance from noise levels associated with construction activities during the avian breeding season could result in abandonment of nests. If adjacent suitable habitat is not available, birds that have been displaced are not likely to nest until habitat becomes available which may result in a higher non-breeding population. Based on the avian SAR habitat modelling results, any SAR individuals displaced by noise would likely move to other suitable habitats within the Study Area or LAA.

Based on the noise model developed for the Project (Appendix E), predicted operational noise levels above 45 dBA are expected to be localized around turbines, depending on the proximity and layout of each turbine with respect to others. Predicted noise levels at 40 to 44 dBA are only expected outside of the Study Area in a few cases, leading to a very low or negligible sensory disturbance impact within the LAA (i.e., only in portions within and potentially along the Study Area edge).

Lighting used during construction, particularly if activities extend into early morning or late evening hours, could also impact birds within the vicinity. Artificial lighting may disorient

nocturnally active birds, increasing the likelihood of attracting them closer to construction areas. For light-sensitive birds, especially migratory and nocturnal species, this could temporarily alter natural behaviours or increase the risk of collisions with equipment or structures. Given the frequency of foggy conditions in portions of the Study Area that encroach on the coastline, light intensity may be amplified, further enhancing the potential for disturbance. Light sensory disturbance that can impact birds includes behavioural effects such as disorientation, avoidance, or attraction (Longcore & Rich, 2004). The nearest distance between the Project Footprint and the coastline is approximately 101 m, suggesting that foggy conditions are likely to occur, particularly along the southern portion of the Study Area which is closest to the coast. Light attraction is a particular concern during nights with low visibility (e.g., low cloud cover or fog) and high winds. Lighting used during construction, particularly if activities extend into early morning or late evening hours, could also impact birds in the vicinity. Artificial lighting may disorient nocturnally active birds, increasing the likelihood of attraction to construction areas. For light-sensitive birds, especially migratory and nocturnal species, this could temporarily alter natural behaviours or increase the risk of collisions with equipment or structures (Longcore & Rich, 2004). Research has demonstrated that birds attracted to or congregating around lights often become disorientated and lose their sense of direction, ultimately disrupting migration (Adams et al., 2021).

Disoriented migratory birds are prone to circling light sources, which increases the potential for death by exhaustion or predation when forced to land in high-risk areas. In turn, these behavioural changes can affect the success of foraging, reproduction, and communication and can disrupt habitat connectivity through anthropogenic development (Bliss-Ketchum et al., 2016; Longcore & Rich, 2004). It has been known that exterior structures such as buildings and other floodlit structures can attract birds during the night and lead to mortality events. In addition, migratory birds during fall and spring are especially attracted to lighting on tall structures. Modifications and timing of use for lighting can be managed to limit impacts on birds (Bliss-Ketchum et al., 2016; Longcore & Rich, 2004).

At night, and especially during cloudy nights with low ceiling, artificial lighting can attract birds during migration. Lights that are known to increase disorientation include consistent white or red lights (Poot et al., 2008). Strobe lights or intermittent/flashing lights have been shown to decrease avian mortality as it interrupts the zone of influence that lighting on birds can have (Longcore et al., 2008). While continuous lighting can attract or disorient birds, especially nocturnal migrants, brief and low-frequency lights reduce the risk of such interactions.

For nocturnally active species that may be more sensitive to artificial lighting, the risk of attraction or disorientation remains low due to the limited light exposure. In the event of foggy or low-visibility conditions (e.g., heavy rain), the short, infrequent flashes will also reduce the overall light presence, limiting the potential for enhanced attraction effects.

Lighting associated with the Project will be minimal and turbine lighting at night will be restricted to Transport Canada required navigation hazard lights mounted on the turbine nacelles. As such, lighting is not expected to impact bird migration.

Upon completion of construction and throughout the lifespan of the Project, the lighting on-site will be minimized, and mitigation measures will be applied, to the extent practicable, to limit the effects of lighting on birds [e.g., motion-activated lighting, shielding, light emitting diodes (LEDs), etc.].

Injury and Mortality Risk

The radar and acoustic monitoring program provided quantifiable insights into the volume, movement patterns, and flight heights of birds moving within the Study Area, enabling a more precise understanding of collision risk relative to the Project's infrastructure.

Bird strikes are a primary concern when considering the interactions of avifauna with the Project, as turbine blades spin at high speeds through the airspace frequented by a variety of species at all different altitudes within the rotor swept area (i.e., 38.3 to 221.7 m). Bird strikes include instances when birds are struck by the rotating turbine blades, or birds collide with the turbine tower or nacelle structures, which can cause injury or mortality to birds. Collisions with transmission lines are also a concern for avian injury and mortality risk. Factors including species abundance, frequency of passage, species-specific flight behaviour, avoidance behaviours, differential use of areas within the Study Area, weather, and topography may all influence collision risk (De Lucas et al., 2008). Estimated bird mortality as a result of wind turbine collisions varies across Canada, with Zimmerling et al. (2013) estimating mortalities at 8.2 per turbine per year. Bird Studies Canada (2016) conducted a study to review mortality across Atlantic Canada and Ontario, showing mortality estimates in Atlantic Canada to be lower, at approximately 1.17 birds per turbine per year. Strum has conducted avian mortality monitoring across a variety of wind projects in Nova Scotia and New Brunswick, with approximately one observable mortality per turbine per year.

Most radar detections were at heights above 250 m and were therefore outside of the interaction risk zone (i.e., the total height of the turbine to the tip of blade; 221.7 m). Approximately 1% of detections recorded by the ARS were within the interaction space (rotor swept area), suggesting little interaction between avian movement and turbines. Based on the radar results showing a few peak detection nights, potential mortality events would likely be limited to a few events during the spring and fall migration periods. Both migration activity and flight heights influence the likelihood of potential collisions; however, other variables such as weather conditions, photoperiod, and lunar cycle may play a role. Comparison of radar data with several of these variables showed that wind speed, wind direction, and temperature appeared to have the most significant influence on migratory activity.

Avian field surveys conducted in 2023 showed that diurnal movement typically occurred at heights of 50 m or less or at heights between 50 m and 100 m. Birds flying at heights greater than 100 m were primarily raptors and corvids, suggesting that these groups may be more vulnerable to collisions. Raptors are considered particularly vulnerable to collisions with wind turbines as they are long-lived species with low rates of reproduction and they typically soar at high altitudes (Estellés-Domingo & López-López, 2025). These impacts are more pronounced in mountainous areas, where raptors often gather in large groups called kettles to take

advantage of thermal updrafts (Estellés-Domingo & López-López, 2025; Katzner et al., 2012). While moderate raptor activity was observed within the Study Area, no instances of kettling behaviour were observed and raptors were typically observed individually or in pairs.

Diurnal watch count surveys were conducted at a notable shorebird feeding area in New Harbour, just south of the Study Area. When compared to survey results from within the Study Area, it was found that shorebird species which congregated along the coast were not observed moving through the interior portion of the Study Area. This result suggests that shorebirds which roost or forage along the coast are unlikely to travel through the Study Area, and that the potential for collisions with turbines is expected to be low. Based on the radar results, any shorebirds that migrate nocturnally through the Study Area would be at low risk of collision. Neither Leach's storm-petrel nor Roseate tern, both identified as users of the nearby IBA, were observed during surveys within the Study Area and are therefore also considered to be at low risk of impact from the Project.

An increase in road traffic during construction and wind turbine maintenance will increase the chances of mortality to avifauna species that use roadways, especially grouse species and similar species, as they are known to use roadways for travel and nesting (Madden & Perkins, 2017; Whitaker et al., 2010). Construction and increased road traffic particularly pose a risk to nests and unfledged nestlings. Outside of the construction phase, the Project will only require technicians to access the site to perform regular maintenance/equipment checks and occasional larger-scale repairs. Considering the pre-existing traffic load (i.e., forestry and off-roading vehicles) and the minimal traffic that will be associated with Project operation, along with road traffic mitigations (e.g., speed limits), road traffic is expected to have a negligible or low effect on avifauna in the LAA.

Mitigation measures will reduce the risk of avifauna interactions with Project equipment and infrastructure, as well as management and monitoring plans (e.g., further radar and acoustic monitoring, which may result in adaptive management measures being taken if applicable).

Migration Disruption

Birds moving through the Study Area during migration seasons may encounter turbines as a new structural barrier. This could potentially lead to natural flight path alterations, which could in turn result in additional energy expenditure to avoid these obstacles. This is particularly relevant for species traveling at altitudes within the infrastructure height range, as they may need to navigate around or above the structures to avoid collisions.

The modified airspace could lead to temporary disorientation for birds unfamiliar with the infrastructure, especially during low visibility conditions such as fog or heavy rain, which are common in the region. Radar results showed peaks in migration activity during fall and spring, with detections within the rotor swept area peaking on a few nights per season. The majority of detections (approximately 99%) occurred above the rotor swept area, suggesting that overall disruption to migratory routes is likely minimal; however, specific conditions or migration events may increase the likelihood of navigational adjustments as birds travel through an unfamiliar environment.

Mitigation Measures

The primary mitigation for avifauna is avoidance in the siting of infrastructure, including:

- Minimizing impacts to the terrestrial environment (e.g., limiting infrastructure impact).
- Minimizing impacts to sensitive bird habitats, such as wetlands, waterbodies, mature forest stands, etc. This includes siting Project infrastructure within areas with existing disturbances, such as existing roads and historically cleared areas, to the greatest extent practicable.
- Avoidance of turbine placement within topographic funnels, such as within lake or river valleys, to reduce the likelihood of interactions with concentrated bird movements.

Mitigations to reduce effects on avifauna include:

- Adhere to ECCC guidelines on clearing windows for nesting migratory birds where practicable. If vegetation and tree clearing activities during the nesting/breeding season cannot be avoided, nest sweeps will be conducted by a qualified avian biologist.
- Allow natural revegetation of disturbed areas where vegetation suppression is not required during operations.
- Develop a site reclamation plan in accordance with engineering standards and in consultation with NSECC and NSNR, to be submitted 2 years prior to the end of operations.
- Establish speed limits for construction vehicles to avoid vehicle-avifauna collisions. Traffic signs will be installed to alert road users of speed limits and the presence of wildlife in the area.
- Service construction equipment and vehicles regularly and, where practical, muffle loud machinery to reduce noise disturbance.
- Maintain good housekeeping practices (i.e., designated garbage and recycling cans and pack out all waste) during construction and operation to avoid indirectly feeding birds and potentially attracting nuisance wildlife.
- Develop and implement a Terrestrial Habitat and Wildlife Management Plan.
- Develop a spill response plan (within the Contingency Plan), equip site machinery with spill kits, and instruct site personnel on their use.
- Minimize lighting, to the extent practicable, while ensuring employee safety.

Monitoring

A site-specific Terrestrial Habitat and Wildlife Management Plan will be developed in consultation with government regulators and all other relevant parties.

A second year of bird radar and acoustic monitoring will be completed, prior to operations, as per requirements under the Environmental Assessment Supplemental Checklist: Wind Energy Projects (NSECC, 2025d).

A detailed Post Construction Avian Monitoring Plan will be developed and submitted to NSECC and NSNR for review. Monitoring activities may include:

- Post-construction avian mortality monitoring.
- Adaptive management if post-construction monitoring identifies significant avian mortality, developed in consultation with NSNR.

Conclusion

The predicted residual effects of the Project on avifauna (after proposed mitigation and monitoring activities) are characterized in Table 10.39.

Table 10.39: Project-Avifauna Residual Effects

Effect Detail	Habitat Loss, Alteration/ Fragmentation, and Edge Effect	Sensory Disturbance – Light and Noise	Injury and Mortality
Magnitude of Effect	Low to Moderate: Low to moderate loss of habitat supporting avian SAR and habitat-sensitive avifauna, depending on the species.	Low: Low sensory disturbances are expected.	Moderate: Avian use of the Study Area indicates a likelihood of interactions but recorded flight altitudes indicate effect is likely at the individual and not population scale.
Geographic Extent of Effect	5 km buffer of the Study Area	5 km buffer of the Study Area	5 km buffer of the Study Area
Frequency of Effect	Single Event: Loss of habitat occurs once during the construction phase (i.e., clearing and ground disturbance).	Intermittent: Intermittent during the construction, decommissioning, and operations phases.	Intermittent: May vary by Project phase, as well as seasonal differences (e.g., breeding, migration, and winter seasons).
Duration of Effects	Medium Term: Effects will end following decommissioning.	Medium Term: Effects will end following decommissioning.	Medium Term: Effects will end following decommissioning.
Reversibility of Effect	Partially Reversible	Reversible	Irreversible
Significance Level	Not Significant	Not Significant	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Negligible, Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible			

11.0 SOCIO-ECONOMIC ENVIRONMENT

11.1 Economy

11.1.1 Overview and Assessment Methodology

The assessment of the economy included consideration of local demographics, income, and businesses, as well as the economic contributions of the Project to the local economy through a review of the following resources:

- Census of Population – Statistics Canada (2023)
- Taxation legislation
- Public mapping resources
- Economic data from the Proponent
- Economic Impact Assessment – Deloitte LLP (2024)

11.1.2 Existing Environment

The Project is in Guysborough County, near the communities of (Drawing 11.1):

- Lundy (measure from the Project's center to the approximate town center, approximately 5 km north)
- Coddles Harbour (8 km south)
- New Harbour (11 km southeast)
- Goldboro (11 km southwest)
- Larrys River (13 km east)
- Tor Bay (15 km east)
- Guysborough (17 km north)

The Guysborough Municipal District (MD) census subdivision corresponds with the MODG, as it will be referred to here. Population statistics for the province and the MODG were summarized using the 2016 and 2021 Census of Population (Table 11.1). The population of the largely rural MODG has declined slightly between 2016 and 2021, contrary to the provincial trend. MODG has a much lower population density than the province.

Table 11.1: Population Characteristics in 2016 and 2021 for Nova Scotia and MODG

Population Statistics	Nova Scotia	MODG
Population in 2021	969,383	4,585
Population in 2016	923,598	4,670
Population change from 2016 to 2021	+5.0%	-1.8%
Total Private Dwellings in 2021	476,007	3,043
Land Area (km ²)	52,824.7	2,115.2
Population Density (per km ²)	18.4	2.2

Source: (Statistics Canada, 2023)

The age distribution in MODG reveals a median age of 58.4 years, over 10 years higher than the provincial median age of 45.6 (Statistics Canada, 2023). Further statistics on age distribution in 2021 were compared for the province and MODG (Table 11.2), revealing that MODG has proportionally fewer people in both 0 to 14 and 15 to 64 year age groups, indicating there are fewer people of working age or who will join the workforce within the next 1 to 2 decades.

Table 11.2: Age Distribution in 2021 in Nova Scotia and MODG

Age Statistics	Nova Scotia	MODG
0 to 14 years	136,710 (14.1%)	515 (11.2%)
15 to 64 years	617,345 (63.7%)	2,455 (53.5%)
65+ years	215,325 (22.2%)	1,615 (35.2%)
Total Population	969,380	4,585

Source: (Statistics Canada, 2023)
 Due to rounding, total percentage may be $\pm 100\%$.

Median housing costs and median household total incomes in 2020 for MODG were compared to the provincial and national values (Table 11.3). This comparison shows that the median dwelling value in MODG was less than half of the provincial figure, which itself is less than half the national median. Examining the relative value of median total income and median dwelling value across these jurisdictions demonstrates that housing is more affordable for those on a median income in MODG than in Nova Scotia or Canada as a whole. This is corroborated by the percentage of owner and tenant households spending over 30% of their income on shelter costs, although this figure may be skewed by legacy homeowners or renters who either own their property outright or have longstanding leases lower than regional averages.

Table 11.3: Housing Costs (2021) and Median Individual Income (2020) for Canada, Nova Scotia, and MODG

Housing and Income Statistics	Canada	Nova Scotia	MODG
Median total income	\$41,200	\$38,000	\$31,200
Median dwelling value	\$618,500	\$250,000	\$120,000
Median total income as a % of median dwelling value	6.7%	15.2%	26.0%
Median monthly shelter costs for owned dwellings	\$1,498	\$870	\$400
Percent of owner households spending 30% or more of their income on shelter costs	14.8%	9.7%	7.0%
Median monthly shelter costs for rented dwellings	\$1,209	\$1,000	\$552
Percent of tenant households spending 30% or more of their income on shelter costs	33.2%	34.7%	22.0%

Source: (Statistics Canada, 2023)

Most residents in MODG (98.6%) use English as their first official spoken language (Statistics Canada, 2023). Because of this, all public outreach and communication for the Project have been and will continue to be in English. There is some knowledge of other languages, though no communication has been requested in other languages.

The nearest fire departments to the Study Area are the Larrys River and District Volunteer Fire Department, approximately 12 km east of the Study Area on Marine Drive and the Harbourview Volunteer Fire Department, approximately 12 km southwest of the Study Area on Marine Drive. Milford Haven Fire & Emergency Services is also nearby, with one location approximately 16 km north of the Study Area on Queen Street in Guysborough and another location approximately 22 km north of the Study Area on Marine Drive in Boylston. The NSNR Fire Tower is approximately 9 km northeast of the Study Area in Lundy.

Health and emergency services also exist in the area and are accessible to Project workers if the need should arise. The closest location is the Guysborough Memorial Hospital, approximately 17 km north of the Study Area on Highway 16. There is also the St. Mary's Memorial Hospital, approximately 37 km southwest of the Study Area near Highway 7 in Sherbrooke.

Statistics indicate that the unemployment rate in 2021 for MODG was 18%, a rate that is higher than both the provincial and national unemployment rates (Table 11.4). The employment rate for MODG was 38%, which was lower than the provincial employment rate of 52% (Statistics Canada, 2023).

Table 11.4: Employment Statistics for Canada, Nova Scotia, and MODG

Employment Statistics	Canada	Nova Scotia	MODG
Employment Rate	57.1%	51.9%	38.0%
Unemployment Rate	10.3%	12.7%	18.1%

Source: (Statistics Canada, 2023)

The top six industries in MODG in 2017 were compared with the province (Table 11.5), as categorized under the North American Industry Classification System (Statistics Canada, 2023). The highest proportion of workers in MODG fall into the “agriculture, forestry, fishing and hunting” and “health care and social assistance” categories (21.6% and 12.5%, respectively). Other significant industries include “manufacturing,” “retail trade,” “educational services,” and “construction” (Statistics Canada, 2023).

Table 11.5: Top Industries for the Employed Labour Force in 2017 in MODG Compared to the Province of Nova Scotia, Including Number Employed, Rank in Jurisdiction, and % of Total Workforce

Industry	MODG	Nova Scotia
Agriculture, Forestry, Fishing, and Hunting	405 (1, 21.6%)	17,880 (3.7%)
Construction	145 (5, 7.7%)	35,720 (4, 7.3%)
Educational Services	145 (5, 7.7%)	38,425 (3, 7.9%)
Health Care and Social Assistance	235 (2, 12.5%)	70,595 (1, 14.5%)
Manufacturing	165 (3, 8.8%)	31,210 (5, 6.4%)
Retail Trade	150 (4, 8.0%)	58,985 (2, 12.1%)
Transportation and Warehousing	90 (6, 4.8%)	19,930 (6, 4.1%)
Others	470 (25.1%)	181,349 (37.2%)
Total Employed Labour Force 15 Years +	1,875	487,260

Source: (Statistics Canada, 2023)

The community of Guysborough is the closest economic center to the Project, located approximately 17 km north of the Project with a range of businesses offering many services. A list of such businesses located near the Project, both within Guysborough and within communities near the Project, was compiled (Table 11.6). This list is not exhaustive, and there are other businesses in the area that will likely benefit directly or indirectly from the Project through the patronage of the business and its employees, and the increased economic activity in the area.

Table 11.6: Local Businesses and Their Approximate Distance

Business ⁽¹⁾	Nearest Community	Approximate Distance and Direction to the Project ⁽²⁾
Drumhead Market – Harbour Island Ecologics Inc.	Drum Head	12 km south
Pump House Fuels	Drum Head	12 km south
Nova Scotia Fisheries	Goshen	5 km south
Chedabucto Home Hardware	Guysborough	14 km north
Authentic Seacoast Distillery & Brewhouse	Guysborough	18 km north
Big G's Pizza & Restaurant	Guysborough	17 km north
Cast Away Cafe	Guysborough	17 km north
DesBarres Manor Inn	Guysborough	17 km north
Midcudlynn Refrigeration & Heat Pump Repair	Guysborough	17 km north
Route 16 Auto Sales	Guysborough	17 km north
Murphy's Inn	Larrys River	13 km east
W.M. Schrader Fisheries LTD	Larrys River	13 km east
Seawind Landing Country Inn	Larrys River	17 km east
Lonely Rock Seaside Bungalow	New Harbour	10 km southeast

⁽¹⁾ Businesses were included based on Google Maps presence.

⁽²⁾ All distances were measured from the centre of the Study Area by a straight line and rounded to the nearest whole number.

Aside from the immediate area and associated businesses, smaller communities are generally dependent on services in Guysborough and larger towns, such as Canso (approximately 43 km northeast) or Antigonish (approximately 55 km northwest), which offer many shops and services, including indoor recreation and big-box stores. Many residents of the communities surrounding the Study Area commute daily to areas within MODG or to Antigonish for employment purposes.

11.1.3 Effects Assessment

Project-Economy Interactions

Project activities have the potential to interact with the economy during all phases of the Project (Table 11.7).

Table 11.7: Potential Project-Economy Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	X
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for economy is the MODG (Drawing 11.1). The RAA for economy includes the entire province.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for the economy as well. The VC-specific definition for magnitude is as follows:

- Positive: Project is expected to have a positive effect on the economy.
- Negative: Project is expected to have a negative effect on the economy.

Effects

The Phase 2 portfolio of EverWind projects, of which this Project is a key component, will provide significant economic benefit and employment within the MODG.

An economic analysis was conducted by Deloitte (2024) to estimate the economic contribution of the Phase 1 and 2 EverWind projects. The capital investments made by EverWind in Phase 2 are expected to contribute \$7.1 billion in gross domestic product (GDP) and support 35,270 full-time-equivalent positions (FTEs) for Canada, and \$3.9 billion in GDP and 16,880 FTEs for Nova Scotia. Further, Phase 2 is anticipated to annually contribute approximately \$1.1 million in GDP, \$151 million in labour income, \$92 million in government revenue to Nova Scotia, and sustain 2,400 FTEs (Deloitte LLP, 2024).

The Proponent is committed to sharing economic opportunities with the local community throughout the development and lifespan of the Project via the use of local skills and labour where practicable, municipal tax revenue, and on-going energy literacy/education (such as site tours to EverWind's Point Tupper Terminal, presentations about renewable energy at local schools, community meetings or for municipal councils, windfarm tours and visits, etc.). The Proponent has delivered site tours to the EverWind Point Tupper Terminal for over 600 students from the Strait Regional Centre for Education and will continue to engage the community, schools, local businesses, and municipal staff and leaders to help identify Project-related opportunities and benefits for the local community.

As outlined in the *Wind Turbine Facilities Municipal Taxation Act* (Nova Scotia, 2006), the MODG will receive tax revenues based on nameplate capacity (per MW) on an annual basis and the royalty is tied to increases in the Consumer Price Index. The Project is expected to enhance the community's economic development by providing tax revenues of approximately \$11 million annually to MODG, increasing each year of operation for a total of approximately \$455 million over the 35 year life of the Project. The MODG operating budget for the 2025 to 2026 fiscal year is approximately \$17 million resulting in a significant revenue increase should the Project advance into operation with a similarly high nameplate capacity. The final determination of municipal tax revenue will be subject to the specific nameplate capacity of the final installed turbines.

The Proponent understands the importance of supporting local communities and the Project Team is committed to using as many local skills as practicable. In alignment with these commitments, the Proponent has entered into a CBA with the MODG to formalize long-term social and economic benefits for the community. Under the CBA, the Proponent will voluntarily establish a Community Benefits Fund (CBF) based on operating wind capacity (\$1,000/MW annually) starting at the end of the first year of operations, supporting local initiatives such as low-income housing, healthcare, education, sports and recreation, and bursaries for students pursuing renewable energy-related post-secondary studies. The payments for the Phase 2

portfolio of projects are expected to be \$2 million each year or \$70 million over the life of the projects. For this Project, it is anticipated that the funds will exceed \$1 million annually for CBF. The CBA outlines a structured approach to workforce development, including commitments to publicize employment opportunities locally, collaborate on training programs, and reduce barriers to employment for MODG residents. Contractors and suppliers engaged in Project construction and operation will be encouraged to source locally and adhere to equitable employment practices.

As part of the EverWind's Phase 2 projects, the Proponent will make available a Bursary Fund prior to commercial operations for community members who want to train in the renewables industry. This will support the additional use of local labour and skills both during the construction phase and operations phase of the Project.

Additionally, the CBA includes provisions for a Local Information/Project Office within MODG and the formation of a CBA Oversight Committee comprising representatives from both the Proponent and the Municipality to guide implementation and reporting. This agreement reflects the Proponent's intent is to create enduring partnerships with local communities and ensure that the economic and social impacts of the Project are inclusive and community driven.

Potential work associated with different stages of the Project includes environmental studies, geotechnical investigation, engineering, land and snow clearing, surveying, worksite security, road construction and maintenance, turbine component transportation, turbine foundation construction, turbine installation, collector system construction, and substation construction. Specifically, elements of job creation throughout the lifespan of the Project may include:

- Project Development: During the development phase of the Project, Nova Scotian professionals have and will continue to deliver services in a variety of areas, including civil and electrical engineering, geotechnical engineering, legal, environmental and biological surveys, archaeological, land and community relations, and many others. Dozens of professionals within Nova Scotia have already rendered their services as part of the development of the Project, and many more will as development matures.
- Construction: Though the construction phase of the Project is approximately five years, it will require a large workforce that will fluctuate throughout the construction period. Much of the construction employment will come through contracting and subcontracting of Canadian, and where practicable, Nova Scotian construction firms and specialized service providers related to the balance of plant and installation and commissioning of the wind turbines. It is estimated that the Project will require approximately 400 to 500 jobs for varying scope and duration throughout the construction period. The largest construction scopes of work are anticipated to be:
 - Civil installation, that is, land clearing, grubbing, road construction, and foundation installation, which includes:
 - Excavating
 - Rebar supply and installation

- Anchor bolt supply and installation
- Forming
- Concrete supply and pouring
- Grouting
- Electrical installation, that is, transmission line, collector line and substation infrastructure installation, and interconnection, which includes:
 - Overhead installation
 - Cable terminations
 - Electrical testing
 - Instrument installation and testing
- Turbine installation, that is, the offloading of turbine components, turbine erection, and commissioning, which includes:
 - Crane supply
 - Turbine offload and erection
 - Mechanical works inside turbines
 - Electrical work inside turbines

The Proponent will look to maximize local contractors and personnel where appropriate. To this end, the Proponent will hold a job fair prior to the start of construction to engage with local community members and service providers and identify suitable candidates and/or businesses to support the construction phase employment and service providers.

- Operations and Maintenance: Operational wind projects require long-term operations and maintenance professionals to be located either on-site or within short driving distance of the Project. Up to 40 to 50 full- and part-time jobs will be required for this Project during operations and maintenance. The employment associated with operations and maintenance is long-term, local, stable, and well-paying, requiring skillsets such as experience managing facilities, working on wind farms, or working with high-voltage systems. These jobs include:
 - Medium-voltage or high-voltage technicians/electricians
 - Wind technicians
 - Road maintenance workers
 - Vegetation management service providers
- In addition to wind turbine operation and maintenance, a variety of wind farm activities will require on-going services such as environmental monitoring, snow removal and road surface maintenance, administrative support, inventory/materials management, shipping, scheduling, and coordination of maintenance inspections to accommodate the facility's operation (i.e., power collection system, electrical substation inspections, etc.).

In addition to the direct investments that the Project would bring to Nova Scotia's economy, the Project will result in indirect and induced economic benefits that will be realized by governments, local businesses, communities, and residents. Workers that are directly involved with the development, construction, and operations would contribute to the local economy by redistributing wealth to a variety of goods and services such as hotels, restaurants, and grocery stores (NREL, 2016).

Mitigation Measures

The economic impact to the LAA and RAA is positive; therefore, no mitigation is proposed.

Monitoring

A specific monitoring program for the economy is not proposed.

Conclusion

The impacts to the economy are expected to be positive.

11.2 Land Use

11.2.1 Overview and Assessment Methodology

Baseline conditions must consider a wide range of land uses within, adjacent to, and near the Study Area. This may include uses by the public or Mi'kmaq for residential (both urban and rural), industrial or commercial activities, agriculture, forestry, protected and resource areas, recreation, and tourism.

The assessment was completed through a review of desktop resources and in consideration of feedback from public engagement to evaluate how the Project may interact with this VC. The following resources were reviewed:

- Nova Scotia property records
- Public mapping resources
- Literature review of property values and wind farms
- Visual renderings of the Project prepared by WSP
- Literature review of wind farm impacts on tourism and recreation
- Review of the local tourism and recreation websites
 - Guysborough County (TGS, 2024)
 - Municipality of the District of Guysborough (MODG, n.d.)

11.2.2 Existing Land Use

The Study Area consists primarily of Crown land (94%). Land use around the Study Area is primarily forestry and recreational use; however, there is a mix of residential and agricultural land uses in the surrounding area (recreational land use is discussed in Section 11.2.2.3).

11.2.2.1 Industrial and Commercial Land Use

There are several proposed developments within 10 km of the Study Area including the following:

- Goldboro Gold Project
- Maritimes and Northeast Pipeline
- Nova Sustainable Fuels Energy Park Project

The Goldboro Gold Project is a surface gold mine that received EA approval in 2022 (NSECC, 2022a). As of 2026, the mine is moving toward construction, having received Industrial Approval from NSECC (#2023-3392341-00). The Nova Sustainable Fuels Energy Park Project, which received an EA approval in 2025 (NSECC, 2025f), is proposing the development of a Sustainable Aviation Fuel production facility using biomass from Nova Scotia's forestry industry, along with renewable energy generation in the nearby Municipality of the District of St. Mary's. The Maritimes and Northeast Pipeline was constructed in the late 1990s, going into operation in 1999, primarily to deliver natural gas from offshore Nova Scotia production to market across the Maritimes, and connecting to the main distribution network of the United States in Massachusetts. Today, with no production of natural gas offshore of Nova Scotia, natural gas flows from the United States to the Nova Scotian Market, including through the Point Tupper Lateral, connecting Goldboro to the industrial park in Point Tupper on Cape Breton Island.

As the Project, Goldboro Gold, Nova Sustainable Fuels and the Maritimes and Northeast Pipeline are all in proximity (Drawing 6.1), it is anticipated that engagement will continue between the parties.

11.2.2.2 Protected and Resource Areas

Six public protected lands and parks are located within 10 km of the Study Area (Drawing 3.3) (all distances measured from the closest boundary of the Study Area, as indicated):

- Loon Lake Nature Reserve (within the Study Area and buffered from the Project Footprint)
- Bonnet Lake Barrens Wilderness Area (1 km northeast)
- Ogden Round Lake Wilderness Area (3 km north)
- Salsman Provincial Park (8 km west)
- Boylston Provincial Park (9 km north)
- Guysborough Headlands Wilderness Areas (six areas total, with two areas bordering the southeastern boundary of the Study Area, one approximately 4 km southeast, and three outside of the 10 km buffer)

There are also seven parks and protected areas currently in review that are within 10 km of the Study Area (Drawing 3.3):

- Isaacs Harbour River Wilderness Area (borders the northwestern boundary of the Study Area)
- New Harbour Provincial Park (borders the southeastern boundary of the Study Area)
- Chedabucto Fault Nature Reserve (border the northern boundary of the Study Area)
- Tor Bay Provincial Park (0.8 km east)
- West Cooks Cove Provincial Park (2 km north)
- Pearts Cove Provincial Park (4 km north)
- Port Bickerton Provincial Park (9 km south)

Based on a review of NSNR's Mineral Resource Land Use Atlas (2021d), there are several mineral exploration licenses overlapping the Study Area, with Goldboro Gold being the most active license currently operating in the Study Area.

There are no Mi'kmaq reserve lands within 10 km of the Study Area. Further consideration of Mi'kmaq resources and the results of the MEKS are included in Section 5.

11.2.2.3 Recreation and Tourism

Baseline conditions for recreation and tourism are considered jointly. While some recreational opportunities may attract locals more often than tourists, and vice versa, the region's natural and cultural offerings are an asset to both groups. Recreational opportunities, therefore, should be understood to apply to both locals and people travelling intra-provincially, interprovincially, or internationally for leisure.

Recreation

The communities of New Harbour, Goldboro, Larrys River, and others near the Study Area, are home to a variety of primarily outdoor recreational activities, including use of the area's trails by ATV riders in the summer and snowmobilers in the winter, beaches, and other unstructured recreation. Additionally, there are nearby indoor community or recreation centres, some with accompanying outdoor infrastructures, such as the Harbourview Community Centre, the Guysborough Recreation Centre, and the Goldboro Interpretive Centre. Tor Bay Provincial Park, a public park with a popular sand beach, is approximately 1 km east of the Study Area and is frequented in the summer for picnics and swimming. Salsman Provincial Park is approximately 8 km southwest of the Study Area and is popular for camping, picnics, hiking, fishing and kayaking.

The region is also known for hiking, camping, and biking. Evidence of ATV or other off-highway vehicle use was observed within the Study Area during biophysical assessments indicating recreational opportunities for motorsport recreationalists. The Ocean Lake Riders ATV Club uses and maintains trails within and adjacent to the Study Area. The Proponent has met with the Ocean Lake Riders ATV Club to better understand their current use and future opportunities which the Proponent aims to support.

There are several notable hikes in the region, including some featured in Michael Hayne's popular Hiking Trails of Nova Scotia (2002), including trails at Black Duck Cove, Chappel Gully,

the Guysborough Nature Trail, Tor Bay and more, however, none are found within the Study Area. Furthermore, a search through the public trails repository AllTrails.com (n.d.), a popular and well-used source for information about hikes globally recommended by Hike Nova Scotia as the source for information about trails in Nova Scotia, found some trails within and near the Study Area. There is Bull Hill Road, located in the southeastern corner of the Study Area near Tor Bay Provincial Park. There is the Jessies Lake Trail leading to Jessies Lake which is adjacent to a portion of the Study Area boundary in New Harbour East. There is also the Tor Bay Trail within Tor Bay Provincial Park, approximately 1 km east from the closest Study Area boundary. The Guysborough Nature Trail runs parallel to a portion of the northern end of the Study Area.

Most game and furbearer hunting seasons in Nova Scotia start in the fall and have varying end dates by species. Deer hunting starts in September and October depending on the method of hunting and age of hunter (NSNR, 2024f). Additional approved hunting or trapping may occur on site per NSNR guidelines. Several fish species were confirmed in watercourses within the Study Area (see Section 9.1), and several waterfowl were also observed (see Section 10.4). There are numerous trails that lead to the edges of the lakes that could be used for fishing or waterfowl hunting in this area. Signs of hunting and human activity were also recorded incidentally during field seasons, which further support various uses of the natural environment within and adjacent to the Study Area.

Cultural Attractions

Guysborough County has a rich history, dating back over 400 years, and offers museums and historical and cultural attractions including the Old Courthouse Museum in Guysborough. Music and theatre are popular in the area, with Mulgrave Road Theatre, a professional theatre company focused on the Atlantic Canadian experience located in Guysborough, as well as the Chedabucto Place Performance Centre for live performances of all types, also located in Guysborough (MODG, n.d.).

Guysborough is home to the Authentic Seacoast Company, who offer three unique accommodations that are themed on the region's history and attractions (Authentic Seacoast, n.d.). There are other accommodations options for tourists available in Guysborough, Larrys River, and New Harbour near the Study Area, such as Lonely Rock Seaside Bungalows in New Harbour, Murphy's Inn in Larrys River, and Seawind Landing Country Inn near Charlos Cove. Other accommodations may also be available through websites such as Airbnb (n.d.), but all are found outside of the Study Area.

Recreation and Tourism Trend

Tourism Nova Scotia's 2019 visitor exit survey collected information on the reason for people's visits and activities that visitors undertook while in Nova Scotia (TNS, 2021). The top five main reasons for visiting Nova Scotia in 2019 among pleasure visitors were:

- For the scenery/natural landscape (22%)
- To visit a specific area or location in Nova Scotia (18%)

- For the seacoast and ocean (14%)
- To do a specific activity (8%)
- To experience Nova Scotia's culture (8%)

Of those who participated in outdoor activities, the most common were coastal sightseeing, visiting a beach, and hiking (TNS, 2021). No spatial data are available from this or other research products of Tourism Nova Scotia regarding the places visited within province, limiting the understanding of the impact that tourism has on the communities that surround the Project. Additionally, no data was found on intra-provincial travel or local use of these resources.

Visitors to the MODG will likely rely on popular paved road networks to traverse through the municipality, with Highway 316 assumed to be the most popular route taken. Highway 316 is a scenic route that showcases the Eastern Shore and is part of Nova Scotia's Marine Drive scenic travelway (TNS, 2025). It is likely that visitors using this route will be travelling to some of the previously mentioned parks and trails, north towards Guysborough and Aulds Cove, west towards Antigonish, or south towards Halifax.

11.2.3 Effects Assessment

Project-Land Use Interactions

Project activities have the potential to interact with land use during all phases of the Project (Table 11.8).

Table 11.8: Potential Project-Land Use Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	X
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	X
Turbine Assembly	X
Interconnection	X
Removal of Temporary Works and Site Restoration	X
Commissioning	X
Operations and Maintenance	
General Operation and Maintenance	X
Vegetation Management	X
Decommissioning	
Infrastructure Removal	X
Site Reclamation	X

Assessment Boundaries

The LAA for land use includes MODG (Drawing 11.1). The RAA is not applicable.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply for land use as well. The VC-specific definition for magnitude is as follows:

- Negligible: No change in land use expected and surrounding land use can largely continue.
- Low: Small reduction in land use expected and/or minor limitations to surrounding land use.
- Moderate: Moderate reduction in land use and/or moderate limitations to surrounding land use.
- High: High reduction in land use and/or widespread limitation to surrounding land use.

Effects

Due to the nature of turbines being tall structures with small footprints, they are highly compatible with other land uses like agriculture, forestry, and ground-based recreation. The forestry activities that are ongoing in the area will have minimal disruption during the construction phase, and no anticipated disruption during operations. Upgraded roads and infrastructure will improve access, limit weather-related access disruptions, and improve the access road conditions, which will reduce wear on vehicles and other industrial equipment. None of the existing and permitted users of the Crown land are expected to be impacted by the Project.

A 2017 study mentions that contrary to the traditional energy industry's direct and indirect impacts on conservation, wind energy can be seen as a complementary land use to conservation and protected areas broadly, as wind energy is not a carbon emitter (Wind Europe, 2017). Given the context of Nova Scotia where the traditional energy source has primarily been coal, land use for wind energy can be seen as a positive step.

Visual Aesthetics

People living and working in the vicinity of wind projects express a wide range of perspectives on the visual aesthetics and social acceptability of large turbines (Kirchhoff et al., 2022). While regulations in Nova Scotia do not require aesthetic impact assessment, visual simulation modelling was completed by WSP to demonstrate expected Project visibility from eight of viewpoints surrounding the Project (Appendix P). These visual simulations were shared at public information sessions (Section 6.2.4) to show members of surrounding communities what the Project will look like from several different viewpoints, once constructed.

Property Value

Potential effects on property value are often a concern of neighbouring residents due largely to anecdotal reports of drastic declines in property values following the nearby installation of a wind energy facility (Gulden, 2011). Despite these concerns, many rigorous and statistically

defensible studies have concluded that wind energy developments have had no significant effect on surrounding property values.

Prior to 2013, the most comprehensive study on the impact of wind farms on property values was completed by Hoen et al. (2009). This research analyzed data on nearly 7,500 sales of single-family homes situated within 16 km of 24 existing wind farms in the United States. Eight different hedonic pricing models failed to generate statistically significant evidence that property values for houses located within 16 km of wind farms are influenced by the developments. Subsequent research by the same researchers but employing additional analyses confirmed these results (Hoen et al., 2010).

A study by Hinman (2010) tracked property transactions in communities located close to a 240-turbine wind farm for an eight-year period that spanned pre-development and operation stages. Hinman found that before project approval, property values in the area decreased. This was attributed to a fear of the unknown effects that the development would have; an effect known as anticipation stigma. However, once the development became operational, property values recovered. This recovery was attributed to a greater understanding of the operational effects of the development. Anticipation stigma, however, was not detected in a similar study in Colorado (Laposa & Mueller, 2010), in which it was concluded that the announcement of a large wind energy development did not significantly reduce the selling prices of homes surrounding the proposed development.

The primary limitation of previous research on the effects of wind energy facilities on surrounding home values has long been the relatively small sample sizes (data sets) of relevant home-sale data. The inability to account for the complexity of the various factors that affect property values has also been cited as a limitation of previous studies. Data had been limited for homes located within approximately 800 m of turbines, where impacts would be expected to be the largest: Hinman (2010) (sample size of 11); Carter (2011) (sample size of 41). This is in part because setback requirements generally result in wind facilities being sited in areas with relatively few dwellings, limiting the number of sales transactions available to be analyzed (Hoen et al., 2013). Although these smaller data sets are adequate to examine large impacts (e.g., over 10%), they are less likely to reveal small effects with any reasonable degree of statistical significance.

A study published in August 2013 by Berkeley National Laboratory was conducted to address these gaps in data and included the largest home-sale dataset to date (Hoen et al., 2013). Researchers collected data from 51,276 home sales spanning 27 counties in nine states, related to 67 different wind facilities. These homes were within 16 km of 67 different wind facilities, and 1,198 of the sales analyzed were within 1.6 km of a turbine, giving a much larger dataset than previous studies had collected. The data span the periods well before announcement of the wind facilities to well after their construction (Hoen et al., 2013).

Two types of models were employed during Hoen et al.'s (2013) study to estimate property-value impacts: (1) an ordinary least squares model, which is standard for this type of study,

and (2) a spatial-process model, which accounts for spatial variability. These models allowed the researchers to control for home values before the announcement of a wind facility (as well as the post-announcement, pre-construction period), the spatial dependence of unobserved factors affecting home values, and value changes over time. A series of robust models was also employed to add an additional level of confidence to the study results (Hoen et al., 2013). Regardless of model specification, the results of Hoen et al.'s (2013) study revealed no statistical evidence that home values near turbines were affected in the post-construction or post-announcement/pre-construction periods. Therefore, the authors concluded that if effects do exist, the average impacts are relatively small (within the margin of error in the models) and/or sporadic (Hoen et al., 2013).

A study analyzing more than 7,000 home and farm sales from 2002 to 2010 in the Melancthon Township and 10 surrounding counties found that Ontario's first and largest wind farm (133 turbines) had "no statistically significant effect" on property values. Further, the study found a lack of significant effect is similar across both rural residential properties and agricultural properties (Vyn & McCullough, 2014).

A more recent review based on housing and property values within specific radii of wind farms and other energy infrastructure by Brinkley and Leach (2019) finds that while most energy infrastructure has an impact on nearby land values, renewable energy projects (including wind farms) do not have statistically significant impacts. These findings are based on seven individual studies of varying scales that all consider the value of property relative to the proximity to wind power, whether a single turbine or more (Brinkley & Leach, 2019).

In 2019, researchers at the University of California, Davis conducted an analysis of property values research in the energy sector. Their analysis found that studies on wind turbines and property values overwhelmingly find that wind turbines do not negatively impact property values at any point during their installment (ACPA, 2023). Similarly, a study of onshore wind energy projects in New England found that negative effects on property value were concentrated within 1 km of the project, were not significant beyond this threshold, and dissipated with time (Dong et al., 2023).

Research has consistently demonstrated that, in a variety of spatial settings and across a wide temporal scale, sale prices for homes near wind energy facilities are not significantly different from those attained for homes sited away from wind energy facilities.

Recreation and Tourism

It is difficult to determine with certainty how tourists will react to a wind-power development. Wind farms are objects of fascination for many who might see them as an attraction or at worst neutral in their tourism decisions. Others may find them intrusive in otherwise natural or rural spaces and choose other, less developed areas for tourism and recreational opportunities. While it is not possible to predetermine recreationalists' response to the presence of or the aesthetic qualities of the Project, including potential impacts to views (Appendix P), the Project's direct impacts on recreational opportunities and the experiences sought after by locals and tourists alike can be examined.

Construction of the Project will likely cause overlap with recreational activities practiced in the Study Area, primarily the use of existing trails and natural environment. Although the Project is not proposing to implement permanent access restrictions (e.g., gates), trails noted to be used by ATVs, snowmobiles, or that provide access to fishing and hunting may be temporarily inaccessible for safety reasons if in proximity to active construction sites. Such closures will be temporary and limited to construction, with similar temporary closures during decommissioning.

A variety of research has attempted to understand the connection between wind energy development and tourism outcomes, both in terms of tourism demand and tourist experience. Most research finds that the effect of wind turbines on both demand and experience is neutral to slightly negative. Work in Portugal found a generally net neutral outcome of onshore wind farms, in which some tourists and residents expressed slightly negative to positive outlooks (de Sousa & Kastenholz, 2015). The researchers examined the potential for wind farms to become areas of tourism interest, which they concluded requires more investigation though may be practical. Alternatively, in Iceland, tourists especially expressed negative views towards turbines from one project in particular (Sæþórsdóttir & Ólafsdóttir, 2020). The authors of this study found that further development in the region would put 'nature-based tourism' and wind energy in competition for land use, highlighting that the conflict between tourism and wind development is dependent on the prevailing type of tourism practiced in an area. In Germany, researchers found a negative relationship between turbines and tourism demand, and highlighted a strong difference between the effect of onshore inland and onshore coastal, turbines (Broekel & Alfken, 2015). These authors, however, point to the need for greater study to determine if these relationships hold when examined at a greater scale. Finally, research in the Czech Republic finds a generally neutral attitude towards wind farms among regional visitors (Frantál & Kunc, 2011). The authors noted that interestingly, tourists had higher acceptance of turbines than residents.

Based on literature review, the potential effects of the Project on tourism and experience need to be understood in the context of the Project's features and the tourism demand in the area. There are little structured recreational opportunities (i.e., established recreation providers) within or adjacent to the Study Area. Given the high prevalence of minimally structured and uncommercialized activities (e.g. hiking and beach exploration), the low prevalence of tourism providers near the Study Area would not necessarily be a deterrent to tourists using the area. It is more likely that visitors to the MODG seeking natural experience will visit established destinations such as the nearby Salsman Provincial Park or Tor Bay Provincial Park, although some reduction in visual aesthetics may be anticipated given the proximity of the Project to the latter. Less-structured recreational activities, such as trail users, may be more affected by the Project through the limitations of trail usage within the Study Area during the construction phase. Some recreationalists, especially off-highway vehicle (OHV) riders, may benefit from the Project due to the increased road network allowing for greater access to trails.

The Project Team is committed to continuing to work with local recreational groups (e.g., Ocean Lake Riders ATV Club) to ensure continued access to the area and associated trails, within the bounds of all safety considerations, particularly during construction. Following

construction, the Proponent is not proposing to gate access roads or restrict movement through the Study Area. For Project and public safety, all substation areas will be fenced throughout operations, but this will only limit access to a small area within the Study Area and not restrict movement. As discussed above, the presence of turbines is highly compatible with most land-based recreation activities and is not expected to limit recreation opportunities, whether by locals or tourists.

Mitigation Measures

The following mitigation measures are recommended:

- Limit trail, road, and area closures to temporary periods within the construction and decommissioning phases for the safety of the public.
- Continue working with local recreation groups to ensure continued access to areas within the Study Area for recreation, including ATV/OHV use, hunting, and trapping.
- Continue engaging with nearby industrial users, landowners and community members.
- Develop a Blasting Management Plan in consideration of nearby industrial land users, if blasting is required.

Monitoring

No monitoring is proposed.

Conclusion

The impact on land use is expected to be negligible, as no change in land value is expected and surrounding land use can largely continue and is therefore considered not significant.

12.0 ARCHAEOLOGICAL RESOURCES

12.1 Overview

The purpose of the Archaeological Resource Impact Assessment (ARIA) was to identify areas of high archaeological potential within the Assessment Area. Cultural Resource Management (CRM) Group Ltd. was retained to conduct the ARIA in 2026.

12.2 Regulatory Context

The *Special Places Protection Act*, R.S.N.S. 1989, c. 438 provides the province of Nova Scotia with a mandate to protect important archaeological, historical, and paleontological sites and remains, including those underwater. A permit is required for any archaeological or paleontological exploration or excavation in Nova Scotia. The permit system ensures that work is completed based on established standards by qualified applicants.

This ARIA was conducted in accordance with the terms of Heritage Research Permits A2026NS044 issued by the NSCCTH – Special Places Program.

As archaeological work can often result in findings or information that is confidential or sensitive, a summary of the results of the ARIA is provided in the EA, with the ARIA reports provided directly to NSCCTH for review. It is understood that the findings and recommendations of the ARIA are considered “draft” until the reports are accepted by NSCCTH. The report completed for the Project has been submitted to NSCCTH and is currently under review.

12.3 Assessment Methodology

The objectives of the ARIA were to provide an overview of the distribution of areas of elevated archaeological resources within the Study Area. Based on engagement with CCTH by CRM Group and given the focused intent, the size of the Project, as well as the absence of any existing Project-related plans for development or other ground impacts, it was determined that an ARIA consisting of a desktop study and not involving any archaeological fieldwork was most appropriate for this EA. CRM Group designed a desktop assessment strategy that included three main elements:

- Mi'kmaw engagement
- A background study
- Predictive modelling of archaeological resource potential

Recognizing Mi'kmaw ties to lands and waters in the vicinity of the Study Area, CRM Group engaged with Kwilmu'kw Maw-klusuaqn - Archaeology Research Division (KMK-ARD) to request information relating to traditional or historical Mi'kmaw use of the Study Area. The information provided by KMK-ARD helped to expand the results of the background study and improved the understanding of the cultural and archeological context of the Study Area.

The background study examined how people have used and occupied the Study Area and surrounding landscape through a review of past archaeological assessments, historic documents (e.g., land grant records, legal surveys, historic maps), and local and regional histories. Satellite and LiDAR digital elevation models (DEMs) were also used to infer evidence of past human settlement and resource use, including remains of historic infrastructure, transportation routes, and navigable waterbodies. The proximity to existing registered archaeological sites, heritage properties, cemeteries, Mi'kma'ki First Nation Lands, Crown land parcels, and protected areas was determined using GIS data to further understand the archaeological context of the Study Area.

Finally, information gathered during Mi'kmaw engagement and the background study was used to develop an archaeological potential model. The locations of cultural and archaeological features such as burial and archeological sites, areas of historic activity, and important travel corridors (e.g., lakes, coastlines, and watercourses) were used to identify zones of elevated archaeological potential within the Study Area. Though acknowledged to be a simplification of the distribution of archaeological resources, the model output provides a useful depiction of areas requiring additional attention.

12.4 Assessment Results

The ARIA led by CRM Group (A2026NS044) resulted in the identification of several modelled areas of elevated archaeological potential throughout the Study Area. CRM Group recommends that field assessments, including ground-truthing the archaeological potential model, be completed prior to the development of the Project. The goal of the field assessments would be to determine any requirements for sub-surface archaeological testing and/or mitigative measures.

12.5 Effects Assessment

Project-Archaeological Resources Interactions

Project activities could interact with archaeological resources during earth moving activities in the construction phase (Table 12.1).

Table 12.1: Potential Project-Archaeological Resources Interactions

Project Phase	Potential for Interaction
Site Preparation and Construction	
Land Surveys	-
Geotechnical Investigations	X
Clearing and Grubbing	X
Access Road Upgrading and Construction	X
Laydown Area and Turbine Pad Construction	X
Transportation of Turbine Components	-
Turbine Assembly	-
Interconnection	-
Removal of Temporary Works and Site Restoration	-
Commissioning	-
Operations and Maintenance	
General Operation and Maintenance	-
Vegetation Management	-
Decommissioning	
Infrastructure Removal	-
Site Reclamation	-

Assessment Boundaries

The LAA for archaeological resources is the Clearing Footprint (Drawing 3.1A to 3.1Q). The RAA is the same as the LAA.

Assessment Criteria

Assessment criteria provided in Section 4.3 apply to archaeological resources. The VC-specific definition for magnitude is as follows:

- Low: Activities have a low potential for encountering archaeological resources during ground disturbance.
- Moderate: Activities have an elevated potential for encountering archaeological resources during ground disturbance, but risk of harm to potential archaeological resources can be mitigated through appropriate actions and procedures.
- High: Activities have an elevated potential for encountering archaeological resources during ground disturbance, and ARIA indicates a high potential for accidental and irrevocable loss of archaeological resources regardless of mitigative measures.

Effects

Impacts on archaeological resources could occur during activities requiring ground disturbance or vegetation clearing. New ground disturbance and vegetation clearing for the Project will be limited to the Clearing Footprint and will occur during the site preparation and construction phase. Ground disturbance will also occur during decommissioning but will be limited to areas previously disturbed during construction.

The results of the archaeological potential model suggest that most of the Clearing Footprint has a low potential for encountering archaeological resources. The potential for interactions with archaeological resources will be further examined through field assessments focused in areas of elevated archaeological potential (post-EA approval).

Mitigation Measures

The following mitigation measures are recommended:

- Complete a site-specific archaeological assessment, including ground-truthing of the areas of elevated archaeological potential identified by the model.
 - Avoid any identified areas of high potential for archaeological resources, where practicable, in detailed design.
 - Conduct additional studies, as required by NSCCTH in areas with high potential for archaeological resources that cannot be avoided.
- Include a chance find procedure related to the potential unexpected discovery of archaeological items or sites, or human remains, during construction, within the Contingency Plan. This would include halting any work immediately upon discovery of suspected resources and contacting NSCCTH. If the resources are suspected to be of Mi'kmaq origin, the Executive Director of KMKNO and SGI would also be contacted.

Monitoring

No monitoring programs are proposed.

Conclusion

The predicted residual effects of the Project on archaeological resources (after mitigation) are characterized in Table 12.2. This is considered a preliminary conclusion, pending the outcome of the site-specific archaeological assessment.

Table 12.2: Archaeological Resources Residual Effects

Effect Detail	Loss of Archaeological Resources
Magnitude of Effect	Moderate: Activities have an elevated potential for encountering archaeological resources during ground disturbance, but risk of harm to potential archaeological resources can be mitigated through appropriate actions and procedures.
Geographic Extent of Effect	Clearing Footprint, should unlikely impacts to archeological resources occur.
Frequency of Effect	Single Event: Should unlikely impacts to archeological resources occur, effects would occur once, during initial ground disturbance or vegetation clearing for the Project.
Duration of Effect	Short Term: Should unlikely impacts to archeological resources occur, they would be limited to the site preparation and construction phase when new ground disturbance and vegetation clearing will occur.
Reversibility of Effect	Irreversible: Should unlikely impacts to archeological resources occur, the effects would not be reversible.
Significance Level	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Low, Moderate, High Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible	

13.0 EFFECTS OF THE UNDERTAKING ON THE ENVIRONMENT

13.1 Summary of Effects of the Undertaking on the Environment

Table 13.1 summarizes the results of the effects assessment for each VC.

Table 13.1: Effects of the Undertaking on the Environment Summary

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
Atmosphere and Air Quality	Fugitive and Exhaust Emissions	Low: Fugitive and exhaust emissions are expected to remain below the maximum permissible ground-level concentrations.	200 m buffer of the Assessment Area	Intermittent: Effects may occur during the Project's construction, operation, and decommissioning phases, but only intermittently.	Short Term: Effects are mainly confined to the construction and decommissioning phases.	Reversible	Not Significant
Climate Change	Net Reduction of GHG Emissions	Positive: Net effect of the Project will be a reduction in GHG emissions.	Nova Scotia	Continuous: Effects will occur continuously during operation.	Medium Term: Effects are expected throughout the operation phase.	Irreversible	Positive effect, significance not evaluated.
Sound	Construction Noise	Low: Construction activities are anticipated to comply with municipal by-laws and permitting.	2.1 km buffer of noise sources	Intermittent: Effects are anticipated during both the construction and decommissioning phases, and rarely during operation.	Short Term: Effects are expected throughout construction and decommissioning, but generally not during operations or after decommissioning.	Reversible	Not Significant
	Operational Noise	Low: Operational sound is predicted to comply with the criteria in the Environmental Assessment Supplemental Checklist: Wind Energy Projects.	2.1 km buffer of noise sources	Continuous: Effects are anticipated throughout operations, although there may be temporary lapses during calm conditions while rotors are not spinning.	Medium Term: Effects are expected throughout operations but end at the start of decommissioning and will not continue.	Reversible	Not Significant

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
Shadow Flicker	Shadow Flicker	Low: Measurable shadow flicker is expected but within regulatory compliance at non-participating receptors.	2.1 km buffer of turbine locations	Intermittent: Effects may occur whenever the turbine rotors are spinning.	Medium Term: Effects are expected throughout the operational phase of the Project.	Reversible	Not Significant
Geophysical Environment	Encountered Geologic Hazard	Moderate: Risk mapping shows the potential for geologic hazards in the Study Area.	800 m buffer of the Project Footprint	Continuous: If present, effects may occur continuously.	Short Term: If present, effects limited to construction and decommissioning.	Partially Reversible	Not Significant
	Change to Groundwater Quality or Quantity	Moderate: Groundwater wells located within 800 m of the Project Footprint.	800 m buffer of the Project Footprint	Intermittent: Effects may occur during blasting (if required).	Short Term: Effects are possible throughout construction (if blasting is required).	Partially Reversible	Not Significant
Surface Water, Fish, and Fish Habitat	Habitat loss	Low: A small loss of fish habitat.	Assessment Area	Single Event: Effects may occur during initial construction.	Medium Term: Effects may occur during all phases but will not extend beyond decommissioning.	Partially Reversible	Not Significant
	Fish Injury or Mortality	Negligible: No loss of fish expected.	NA	NA	NA	NA	Not Significant
	Changes to Water Quality and Quantity	Low: Minimal potential for altered hydrology or impact to fish.	Assessment Area	Intermittent: Effects may occur during initial construction and during operations.	Medium Term: Effects may occur during all phases but will not extend beyond decommissioning.	Partially Reversible	Not Significant

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
Wetlands	Habitat Loss	Moderate: Direct loss of habitat, including that of WSS, but wetland area loss will not impact the hydrology of the watershed. Where WSS are impacted, adequate general SAR habitat is prevalent elsewhere within the RAA.	Assessment Area	Single Event: Effects will occur once, during initial ground disturbance or vegetation clearing for the Project.	Medium Term: Residual effects will extend until wetlands are restored during decommissioning and/or compensated for following construction.	Partially Reversible	Not Significant
	Changes in Wetland Function	Low: Project activities have low potential for changes to wetland function with the implementation of mitigation measures.	Assessment Area	Single Event: Direct effects resulting from construction activities will occur once, and indirect effects to wetland function will be mitigated through the use of controls.	Medium Term: Residual effects may extend through the operation and maintenance phase of the Project.	Partially Reversible	Not Significant
Terrestrial Vegetation Communities and Flora	Loss or Alteration of sensitive vegetation communities	Low: Small loss of sensitive vegetation communities.	100 m buffer of the Clearing Footprint	Single Event: Effects may occur during initial site preparation and construction.	Medium Term: Effects will end following decommissioning.	Partially Reversible	Not Significant
	Loss of flora SAR or SOCI and Impacts on supporting habitat	Moderate: Small loss of or effects on terrestrial flora SAR and SOCI individuals (and associated habitat) that do not have legislated protection status, but their populations remain largely intact.	100 m buffer of the Clearing Footprint	Single Event: Effects may occur during initial site preparation and construction.	Medium Term: Effects will end following decommissioning.	Partially Reversible	Not Significant

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
	Indirect effects on vegetation communities and flora	Low: Low impacts to sensitive vegetation communities and flora SAR and SOCI due to indirect effects.	100 m buffer of the Clearing Footprint	Intermittent: Effects may occur throughout all Project phases.	Medium Term: Effects will end following decommissioning.	Partially Reversible	Not Significant
Terrestrial Fauna	Habitat Loss and Fragmentation	Low: Small loss of habitat supporting fauna SAR.	5 km buffer of the Study Area	Single Event: Effects expected to occur during construction phase.	Medium Term: Effects will end following decommissioning.	Partially Reversible	Not Significant
	Sensory Disturbance	Low: Low impacts to fauna through sensory disturbance.	5 km buffer of the Study Area	Intermittent: Effects occur occasionally or intermittently during one or more phase of the Project.	Medium Term: Effects will end following decommissioning.	Reversible	Not Significant
	Injury or Mortality	Low: Low impacts to fauna through injury and mortality.	5 km buffer of the Study Area	Intermittent: Effects occur occasionally or intermittently during one or more phase of the Project.	Medium Term: Effects will end following decommissioning.	Partially Reversible	Not Significant
Bats	Habitat Fragmentation and/or Loss	Low: Low loss of suitable bat habitat is expected (about 1.5% of suitable habitat available within the LAA).	5 km buffer of the Study Area	Single Event: Effects may only be associated with clearing during construction.	Medium Term: Effects will end following decommissioning.	Partially Reversible	Not Significant
	Injury or Mortality	Moderate: Minimal loss of individuals is expected.	5 km buffer of the Study Area	Intermittent: Effects may occur seasonally between dusk and dawn during operations and temporarily during construction.	Medium Term: Effects will end following decommissioning.	Irreversible	Not Significant

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
	Sensory Disturbance	Low: Low impacts to habitat usage (i.e., effective habitat loss) due to sensory disturbance is expected.	5 km buffer of the Study Area	Continuous: Effects may occur sporadically during construction and decommissioning but may be constant (though spatially limited) during operations.	Medium Term: Effects will end following decommissioning.	Reversible	Not Significant
Avifauna	Habitat Loss, Alteration/ Fragmentation, and Edge Effect	Low to Moderate: Low to moderate loss of habitat supporting avian SAR and habitat-sensitive avifauna, depending on the species.	5 km buffer of the Study Area	Single Event: Loss of habitat occurs once during the construction phase (i.e., clearing and ground disturbance).	Medium Term: Effects will end following decommissioning.	Partially Reversible	Not Significant
	Sensory Disturbance – Light and Noise	Low: Low sensory disturbances are expected.	5 km buffer of the Study Area	Intermittent: Intermittent during the construction, decommissioning, and operations phases.	Medium Term: Effects will end following decommissioning.	Reversible	Not Significant
	Injury and Mortality	Moderate: Avian use of the Study Area indicates a likelihood of interactions but recorded flight altitudes indicate effect is likely at the individual and not population scale.	5 km buffer of the Study Area	Intermittent: May vary by Project phase, as well as seasonal differences (e.g., breeding, migration, and winter seasons).	Medium Term: Effects will end following decommissioning.	Irreversible	Not Significant
Economy	Economic Impact	The economic impact is expected to be positive throughout the lifespan of the Project. As a positive effect, significance is not evaluated.					

VC	Effect	Magnitude of Effect	Geographic Extent of Effect	Frequency of Effect	Duration of Effect	Reversibility of Effect	Significance Level
Land Use	Land Use or Value Change	The impact to land use is expected to be negligible, as no change in land value is expected and surrounding land use can largely continue and is therefore considered not significant.					
Archaeological Resources	Loss of Archaeological Resources	Moderate: Activities have an elevated potential for encountering archaeological resources during ground disturbance, but risk of harm to potential archaeological resources can be mitigated through appropriate actions and procedures.	Clearing Footprint, should unlikely impacts to archeological resources occur	Single Event: Should unlikely impacts to archeological resources occur, effects would occur once, during initial ground disturbance or vegetation clearing for the Project.	Short Term: Should unlikely impacts to archeological resources occur, they would be limited to the construction phase when new ground disturbance and vegetation clearing will occur.	Irreversible: Should unlikely impacts to archeological resources occur, the effects would not be reversible.	Not Significant
Effects Assessment Ratings (Refer to Table 4.4 for definitions) Magnitude: Negligible, Low, Moderate, High, Positive Frequency: Single Event, Intermittent, Continuous Duration: Short Term, Medium Term, Long Term Reversibility: Reversible, Irreversible, Partially Reversible							

14.0 EFFECTS OF THE ENVIRONMENT ON THE UNDERTAKING

The following section discusses potential effects of the natural environment, including climate change, natural hazards, and weather events, on the infrastructure and operation of the Project. Potential sources of effects from the environment are described below, including mitigation and design strategies for reducing the significance of residual effects.

The primary mitigative measure employed during the construction and operation of the Project is to educate and train site personnel. Environmental and safety orientations will be conducted prior to the start of construction and all staff will be informed of the potential effects of the environment on the Project. Staff responsible for the operation and maintenance of the Project will be trained on the design and operation of the turbines, including applicable operating procedures, safety protocols, and evacuation plans. To further mitigate damages that cannot be controlled by education and training alone, turbines will be equipped with safety mechanisms to limit damage resulting from extreme weather events.

14.1 Climate Change

Climate change refers to a long-term, persistent change in average and extreme weather conditions. Contemporary climate change (i.e., since the beginning of the industrial period) is being caused by increases in GHG emissions associated with human activities. Warming temperatures, altered precipitation regimes, and sea level rise are three notable aspects of climate change with potential to impact Project operations.

14.1.1 Increased Air Temperature

A key aspect of climate change is global warming, which refers to the long-term rise in the Earth's average surface temperature, measured over 30 years, in comparison to preindustrial levels (IPCC, 2018). Air temperatures are an important driver of many environmental processes, including the intensity of severe weather events such as hurricanes (Gilford et al., 2024). Based on a range of emissions scenarios (Coupled Model Intercomparison Project Phase 6), median temperatures in the Study Area are expected to be 2.4°C to 3.6°C warmer during the period 2041-2070 relative to the 1971-2000 baseline, while the number of days with a humidex above 30°C are expected to increase by 18 to 33 days per year (ClimateData.ca, 2025).

Temperature increases associated with global warming may impact all phases of the Project as well as the comfort of on-site personnel. For example, higher and more frequent temperature extremes may impact the integrity and lifespan of Project infrastructure, including unpaved roads. At the same time, Guysborough County is expected to experience fewer freeze-thaw cycles in the coming years which may reduce damage to infrastructure (NSECC, 2025g), highlighting the complexity of project planning in the context of climate change.

To maintain the comfort and safety of on-site personnel, it is likely that the demand for cooling in construction vehicles will increase alongside warming temperatures and personnel may be required to take regular breaks to cool down and rehydrate. Warmer temperatures also have

the potential to enhance the spread and abundance of disease vectors such as ticks (Bouchard et al., 2019), with associated increases in health risks. Longer and more intense heat waves under climate change may also increase the risk of forest fires (ECCC, 2019b), which impact site personnel as well as Project operations (described further in Section 14.2.3).

The direct risks of increased temperatures to Project personnel will be managed by ensuring staff are trained to understand the importance of regular breaks, proper hydration, and unsafe working conditions. Regular inspection and maintenance will help to manage risks to Project infrastructure.

14.1.2 Changes in Precipitation

Heavy rainfall events are a common, highly probable natural hazard in Nova Scotia that may be exacerbated by climate change. Although it is difficult to accurately forecast decadal-scale changes in rainfall events, future climate scenarios suggest that conditions will become “wetter” over the Project’s lifespan. For example, total annual precipitation in the Study Area is expected to be 94 mm/y to 140 mm/yr higher over the period 2041 to 2070 relative to the 1971 to 2000 baseline (ClimateData.ca, 2025). Heavy rainfall events have the potential to impact construction and operations by increasing the risk of overland flooding which may temporarily restrict site access, overwhelm ditches and culverts, and require operational strategies to be implemented (e.g., sedimentation and erosion controls).

While the climate of the Study Area is expected to become wetter overall, prolonged dry periods will continue to occur. Periods of dry conditions may impact Project operations (e.g., by limiting construction activities) if forest access is restricted due to increased wildfire risk (e.g., woods access restrictions). Droughts may also limit fire-fighting abilities if water levels are low in nearby lakes and rivers and may cause an increase in fugitive dust emissions during construction that require management via mitigations.

The Project will mitigate the risks of flooding and drought by:

- Developing and implementing a Surface Water Management Plan.
- Minimizing alterations to wetlands.
- Sizing culverts appropriately for anticipated increased precipitation events.
- Designing roadside ditches and water off-take infrastructure next to all roads to encourage rainwater drainage.
- Maintaining regular upkeep of surface water infrastructure.
- Allowing for natural revegetation of roadsides to absorb excess water.

14.1.3 Sea Level Rise

On a global scale, sea levels are currently rising because of warming air and ocean temperatures (via thermal expansion of ocean water and increased inputs of melting of sea ice/glaciers). Sections of the Atlantic coastline have been highlighted as some of Canada’s most severely threatened areas from sea level rise and resulting impacts, with rising sea levels expected to amplify coastal flooding, erosion, and storm surge across the Atlantic region

(ECCC, 2023). According to the National Oceanic and Atmospheric Administration (NOAA, n.d.), the relative sea level trends across Nova Scotia ranges from approximately 3.19 mm/y to 3.99 mm/y (based on data from 1895 to 2021).

The majority of new Project infrastructure will be at an elevation (up to 208 masl) and distance from the coast such that direct impacts of coastal flooding are unlikely. However, access routes located along the Atlantic Coast, including highways and shipping routes, have potential to be impacted by rising water levels, erosion, and coastal flooding, with possible disruptions to Project operations. For instance, severe coastal flooding events could impact public roads and bridges near the Study Area, including Highway 316 (NSECC, 2025c) in the Study Area. As several alternate access routes to the Study Area are available (described in Section 3), the risk coastal flooding restricting site access for Project personnel is low.

14.2 Natural Hazards

Nova Scotia regularly experiences natural hazards, including severe weather events (e.g., blizzards, hurricanes) and wildfires. These events can lead to adverse outcomes such as power outages, health-related emergencies, infrastructure damage, and road damage, thereby posing direct risks to infrastructure (Public Safety Canada, 2024). In addition to severe weather events and wildfires, a natural hazard that is unique to wind energy projects is the possibility of turbine icing.

14.2.1 Severe Weather Events

Hurricanes, blizzards, and other severe weather events are natural hazards that have the potential to impact the Project through direct effects to infrastructure and personnel, and through disruptions to site access. During severe weather events, safety risks may be elevated due to hazardous driving conditions, poor visibility, cold temperatures, and falling debris. Throughout the life of the Project, the safety of Project personnel will be managed by developing and implementing safe work procedures, and ensuring staff are trained in the use of PPE and understand unsafe work conditions.

High winds and lightning, which may be associated with heavy rainfall or hurricane conditions, may increase the risk of mechanical issues or electrical fires. To mitigate this risk, turbines will be monitored remotely and equipped with an automatic shutdown that will engage when wind thresholds are reached (i.e., cut-out speed). Turbines will also be designed with a built-in grounding system for lightning strikes.

14.2.2 Wildfire

Wildfire poses a potential risk to the Project during all Project phases. A substantial portion of the Project Footprint is surrounded by forest cover and there is potential for naturally occurring and/or human-caused forest fires to damage Project infrastructure and elevate safety risks for Project personnel.

Fire is one of the sources of natural disturbance in Nova Scotia, with moderate to high severity fires impacting an estimated 0.17% to 0.4% of forested land per year (A. R. Taylor et al., 2020).

In the Eastern Interior Ecodistrict, which encompasses roughly half of the Study Area, forest conditions have historically been conducive to frequent stand-level disturbances by wildfire (Neily et al., 2017). Although it is challenging to precisely predict changes to fire regimes, modelling suggests wildfire risk in the Acadian forest region (which includes the Study Area) will increase moderately under climate change as a result of warmer and drier conditions (Whitman et al., 2015). In recent years, several large wildfires have occurred in Nova Scotia, which were exacerbated by prolonged dry periods (e.g., Upper Tantallon/Hammonds Plains fire in 2023, Long Lake fire in 2025).

The following operational and technological measures will be implemented:

- Develop and implement a Project-specific Contingency Plan that includes a fire safety plan. Circulate the plan to local fire departments for input and awareness.
- Engage with first responders on site access and availability of water resources for fire suppression.
- Ensure fire response equipment is available at the O&M building and that site personnel are trained in its use.
- Equip each turbine with integrated condition-monitoring and control systems with automated shutdown function and alerts to operations personnel.

14.2.3 Turbine Icing

Turbine icing occurs when ice accumulates on the surface of turbine blades, a condition created by specific temperatures and levels of humidity or the presence of freezing rain. Icing may occur more frequently when turbine blades reach 150 m above ground where lower clouds may contain supercooled rain during the cold season (Seifert et al., 2003). Turbine icing may lead to ice throw or ice fall, and the distance and direction in which the ice is thrown/falls is dependent on factors such as wind speed, rotor speed, rotor azimuth, the position of the ice on the blade, and the characteristics of the ice itself.

The maximum throwing distance of ice from a turbine, as determined using the following equation (CREA, 2020) is:

$$d_t = 1.5 * (D + H)$$

Where:

d_t = Maximum throwing distance (m)

D = Rotor diameter (m)

H = Hub height (m)

Based on the above equation and turbine model specifications (183.4 m rotor diameter and 130.0 m hub height), the maximum theoretical throwing distance associated with the Project's turbines is 470.1 m. Note that the equation above is a simple ballistics model that overestimates actual ice throw and does not account for particle size or distribution of the ice throw within the maximum theoretical distance.

A Swedish research study published in 2017 that involved a comprehensive determination of ice throw area found that 75% of located ice fragments thrown from turbine blades were within one rotor diameter distance from the turbine tower (Lunden, 2017). In the case of the turbine model being considered for the Project, this represents a distance of 183.4 m. The ice throw study also noted that a very low percentage of identified ice fragments were located beyond 1.5 times the length of the rotor diameter (Lunden, 2017). Regardless, all potential receptors are located beyond the distance identified using the ballistics model, with the nearest potential receptor located 717.0 m from a turbine. Ice throw presents a risk to those who will work in close proximity to turbines during operations. Such access may be required when icing is a factor, and possibly because of icing.

To reduce the risk of injury from ice throw or falling ice, mitigation measures to protect recreation users and site workers from ice throw or shedding will include:

- Equip turbines with blade anti-icing or de-icing systems.
- Equip turbines with automatic shutdown systems that can activate in instances of ice shedding.
- Continue engagement and education with local recreational users regarding the safe continued use of lands within the Study Area.
- Install signage illustrating and warning of potential hazards associated with ice throw and shedding around wind turbines.
- Equip staff and workers accessing turbines for maintenance or other purposes with necessary PPE and associated safety protocols and procedures to mitigate risk of injury and/or fatality, especially during potential icing conditions.

14.3 Summary of Effects

Environmental effects associated with climate change and natural hazards have the potential to affect the Project. Project location siting and design measures will minimize many of the risks associated with these environmental hazards, and the mitigation measures described above will allow for both proactive and adaptive management of any remaining risks, thus limiting the likelihood of impacts on all phases of the Project.

15.0 ACCIDENTS AND MALFUNCTIONS

Without proper mitigation, accidents and malfunctions can interact with many VCs and potentially result in adverse effects. However, implementing preventative measures limits the probability of occurrence, and having appropriate response procedures in place reduces the magnitude of residual effects.

Accidents, malfunctions, and unplanned events considered for this Project include:

- Erosion and sediment control failure
- Fire
- General hazardous material spill

- Structural damage
- Transportation-related incidents
- Ice throw (addressed in Section 14.2.3)

The safety of on-site personnel is a vital Project component; however, it is not specifically considered in the EA as workplace occupational health and safety is regulated by the policies, procedures, plans, and codes of practice set in the *Occupational Health and Safety Act* (Nova Scotia, 1996). A site-specific Contingency Plan will be developed to address accidents, spills and malfunctions.

The Proponent uses the principles of Safety in Design, a proactive engineering approach that considers all potential hazards and designs systems to eliminate or minimize the likelihood of accidents or injuries. The Project will be designed and constructed in strict compliance with the principles of Safety in Design. EverWind has a long history of safely operating the Point Tupper Terminal, located approximately 40 km northeast of the Project in Point Tupper, and recognizes the importance of ensuring the safety of workers, the public, and the environment. At the Point Tupper Terminal, EverWind has created a world class Emergency Response Team (ERT). The EverWind ERT is comprised of 40 members that are NFPA 1081 Advanced Industrial Firefighter certified, NFPA 470/472 Haz Mat certified, NFPA 1006 Technical Rescue (High Angle Rescue and Confined Space Rescue), and St. John Ambulance Advance First Aid certified. In addition, one of EverWind's ERT members is a certified Paramedic with 12 years' experience with Wood Buffalo Fire & Emergency Services.

EverWind also operates an NSECC approved fire training facility at its Point Tupper Terminal and hosts bi-annual live fire training exercises for regional volunteer fire departments and other local industrial ERTs.

15.1 Erosion and Sediment Control Failures

Failure of erosion and sedimentation controls may result in potential adverse effects on VCs (primarily during construction), most notably to watercourses, wetlands, and fish and fish habitat. Erosion and sedimentation controls may fail due to extreme weather conditions (e.g., flooding), improper installation, improper maintenance, and unforeseen accidents (e.g., collisions). Failure of these control measures may release sediment into the environment, impacting water quality and aquatic and terrestrial habitats.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Provide workers with training to properly install and repair erosion and sediment controls.
- Develop and implement an Erosion and Sedimentation Control Plan for all phases of the Project.
- Conduct regular monitoring of all erosion and sediment controls, and repair or replace as necessary.

- Develop and implement a Project-specific Contingency Plan that includes information on sediment and erosion control.

15.2 Fires

An accidental fire could potentially adversely affect the atmospheric environment (emissions), the terrestrial environment (vegetation and wildlife), and the socio-economic environment (land use and value) during all Project phases.

Fires in wind farms are most often caused by lightning strikes, mechanical and hydraulic faults, and electrical installation failure (You et al., 2023). Publicly available data cannot provide exact statistics, but the rate of fire is estimated to be between 1-in-2,000 and 1-in-15,000, or between a 0.05% and 0.007% chance of fire (Krcmar, 2021), though this will be affected by the installation of fire mitigation technologies such as lightning protection systems.

Various standards and guidelines have been implemented to minimize the chances of fires occurring in turbines and associated infrastructure. The turbines planned for use in this Project are compliant with the International Electrotechnical Commission's IEC 61400 international standard to avoid damage from hazards during their operational lifespan. This includes lightning and surge protection measures. The turbines are equipped with early detection and control systems, including breakers, temperature and pressure sensors (e.g., PT sensors), that continuously monitor key components such as the gearbox, generator, and electrical systems. If electrical currents or temperatures exceed pre-set thresholds, the turbine will automatically enter a safe shutdown state to prevent potential damage or fire. These systems are monitored remotely via the turbine's SCADA system, allowing operators to respond quickly to abnormal conditions.

In addition to general safety protocols and training, a Fire Prevention and Evacuation Plan will be developed within the Project's Contingency Plan. The Proponent is also committed to working with local fire departments (Larrys River and District Volunteer Fire Department and Harbourview Volunteer Fire Department) to provide site orientation, mapping, and a tour of the wind farm to familiarize them with the site, turbine locations, and the locations of other key infrastructure and safety features.

Wildfires are addressed in Section 14.2.2.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include:

- Equip each turbine with integrated condition-monitoring and control systems with automated shutdown functions and alerts to operations personnel.
- Prohibit the use of campfires or burning within the Study Area by staff and contractors.
- Dispose of all flammable waste regularly at an approved facility.
- Allow smoking in designated areas only.
- Equip heavy machinery with fire extinguishers.

- Require turbine technicians heading “up-tower” to carry a fire extinguisher.
- Ensure fire response equipment is available at the O&M building and that site personnel are trained.
- Develop a Contingency Plan including fire safety plan. Circulate the plan to local fire departments for input and awareness.
- Continue to engage with first responders on site access and access to water.

15.3 General Hazardous Material Spills

Hazardous spills resulting from fuel (i.e., storage, refueling, operation of combustion vehicles) and other on-site chemicals may occur during the Project's construction and operations activities. Hazardous spills can adversely impact air, soil, surface water, groundwater quality, human health, and safety. In addition, hazardous spills may risk the health of aquatic, avian, and terrestrial wildlife. The severity of the impacts will depend on the nature of the hazardous material and the quantity spilled.

Mitigation measures to limit the probability of an occurrence and reduce the magnitude and extent of potential effects include the following:

- Develop spill prevention and response procedures within the Contingency Plan.
- Store all fuels, lubricants, and chemicals in designated containers and areas.
- Provide secondary containment in storage areas (where possible).
- Inspect equipment for fluid leaks.
- Locate fuel storage areas, refueling, and/or equipment lubrication a minimum of 30 m from any surface and groundwater feature (i.e., watercourse, well).
- Ensure workers remain with equipment during refueling.
- Complete equipment servicing off-site, where practicable. If this is not possible, require that the work is completed in a designated area, greater than 30 m from a watercourse/waterbody/wetland.
- Store all dangerous goods in compliance with the Workplace Hazardous Material Information System.
- Equip mobile equipment with spill kits stocked with appropriate spill containment materials for the activities taking place, such as soaker pads, oil-absorbing materials, and containment booms.
- Locate stationary spill kits or spill drums at work areas using mobile equipment, hazardous fluids and/or in proximity to environmentally sensitive areas (e.g., wetlands or watercourses).
- Stock spill kits with the appropriate quantity and type of material for the anticipated product type(s) and volume(s) in use.
- Train site workers on site specific spill response requirements and equipment.

With the implementation of the above preventative measures, the likelihood of an accident or a malfunction is low. Appropriate response plans will be put in place to ensure any interactions with VCs from an accident or malfunction are limited and the effects can be quickly contained.

15.4 Transportation-related Incidents

Operator error or techno-mechanical malfunctions may occur during all stages of the Project's lifespan, although the type and intensity of vehicular traffic will vary depending on the Project phase. The construction and decommissioning phases will see the highest volume of traffic and largest vehicles both travelling to and on the site. On the site especially, where workers may be near light to heavy-duty traffic, there is a higher risk of incidents affecting human health (HSE, n.d.). During operation, vehicular access by technicians also presents risks that must be managed. While vehicular use has implicit risks that cannot be fully eliminated, an established Traffic Management Plan will ensure that these risks are mitigated to the highest degree practicable and that they are understood by anyone accessing the Study Area.

Additionally, mitigation measures to limit the probability of an incident and reduce the magnitude and extent of potential effects include:

- Develop a Traffic Management Plan outlining traffic management procedures.
- Assess site access routes, including structural integrity of bridges and culverts, baseline traffic levels and high-risk areas prior to construction.
- Install appropriate traffic signage and road markers to identify high-risk areas and communicate traffic rules and safety information.
- Conduct preventative vehicle inspections to ensure all mobile equipment is in good condition (breaks, light system, leaks absent).
- Develop and maintain roads according to the Erosion and Sedimentation Control Plan.
- Establish, post, and enforce speed limits on site.
- Require that public road speed limits are followed by Project vehicles.
- Require that drivers follow all laws and regulations pertaining to distracted (e.g., cell phone usage) or impaired driving on and off site.
- Require that only licensed individuals operate heavy equipment.
- Follow weather statements and alerts and adjust plans accordingly to avoid transportation in extreme weather conditions.
- Install signage where existing trails cross access roads to avoid potential interactions with trail users when heavy equipment is in use.
- Operate in appropriate weather and provide ample lighting and visibility aids (e.g., mirrors around tight turns).
- Require that visitors are familiar with the Project Footprint or are accompanied, whether in vehicles or on foot.

Detailed information regarding vehicle collision prevention and response procedures will be outlined in the Contingency Plan.

15.5 Structural Damage

Wind turbine damage up to and including failure may result from a variety of factors, both human and environmental, presenting risks to human health, infrastructure, and the environment. The most frequent causes of damage to turbines that may result in failure include damage from lightning, material fatigue over time, leading edge erosion, and damage from

icing (Katsaprakakis et al., 2021). While damage by these mechanisms and others is unavoidable in many cases, preventing failure or harm to human or environmental health is critical. This typically involves detecting damage before it can result in a complete failure, including partial or full blade detachment. Wind turbine structural health monitoring, through use of advanced sensors, can detect anomalies in performance and abnormal vibrations that might indicate an imbalance requiring further investigation (Algolfat et al., 2023).

Regular monitoring and inspections are essential for ensuring the continued structural integrity of all components of turbines (Enlita, 2024), and the Proponent will implement mitigative actions to limit the probability of an occurrence and reduce the magnitude and extent of potential effects, including:

- Maintain sufficient lubrication in bearings, and keep seals clean to prevent excess friction and overheating.
- Maintain and test the lighting protection system and verify grounding integrity.
- Prepare and enact severe weather plans to reduce the risk of physical damage from flying debris or hail and minimize the risk that thermo-electric damage by lightning results in blade failure.
- Inspect and properly maintain turbine pitch, yaw, overspeed, and mechanical brake function.
- Check and change lubrication regularly in the turbine gearboxes to prevent excess heat and minimize wear; conduct oil sampling/analysis at regular intervals.
- Test SCADA/condition-monitoring sensors regularly to ensure that anomalous conditions are detected early and managed before they result in damage to turbines, other infrastructure, or harm human health.
- Inspect blades (e.g., drone/rope access), maintain leading-edge protection, and repair surface defects to control blade erosion and fatigue.
- Implement ice detection/operating procedures and establish temporary exclusion zones during icing events.

The separation of turbines from people and public roads also mitigates the risk to human health and public infrastructure in the highly unlikely event of a failure.

16.0 CUMULATIVE EFFECTS

16.1 Overview

Cumulative effects are changes to environmental, social, and economic values caused by the combined effect of past, present, and potential future human activities and natural processes (Government of British Columbia, 2024). Concerns are often raised about long-term changes that may occur not only as a result of a single action but of the combined effects of each successive action on the environment (Hegmann et al., 1999). While a single undertaking might not cause significant adverse effects, multiple undertakings may result in incremental impacts, referred to as cumulative effects. These cumulative effects may potentially result in an overall impact on a VC.

16.2 Cumulative Effects Assessment Methodology

The objective of the cumulative effects assessment (CEA) is to evaluate potential changes to a VC that may result from the combined influence of the proposed Project and other past, present, or reasonably foreseeable future projects or activities. The CEA is conducted using publicly available information, with uncertainties clearly identified, and in accordance with the Cumulative Effects Assessment Practitioners Guide (Hegmann et al., 1999). As outlined by Hegmann et al. (1999), the CEA scoping process involves the following steps:

- Selection of VCs to be included in the CEA.
- Determination of spatial and temporal boundaries for the CEA.
- Identification and description of other projects or activities within those boundaries.
- Confirmation of which VCs will proceed through the CEA analysis.

For those VCs selected for the CEA process, an analysis was conducted considering the residual effects of the Project on that VC, the effect of other activities or projects on that VC, and the potential for cumulative effects. Mitigation measures and proposed monitoring programs and follow-up are described, if cumulative effects are predicted. At this stage, the certainty in effects predictions was considered. It is not uncommon for data on effects of other projects or activities to be limited, increasing the uncertainty of the CEA predictions.

16.3 Selection of VCs for Evaluation in the CEA

The primary effects pathways of the Project include the loss and alteration of terrestrial habitats and wetlands (and therefore effects to species that rely on those habitats), as well as potential bird and bat mortality resulting from interactions with wind turbines. Depending on the proximity of nearby projects, pathways may also exist for the effects of sound and interactions with the geophysical environment to add to the effects of nearby activities. Based on the effects assessment for each VC evaluated, no significant adverse residual effects were identified for these or other VCs. Details of the effects assessment for each VC can be found in Sections 7 to 12 and are summarized in Section 13 (Table 13.1).

Table 16.1 summarizes the potential for the Project to interact with the effects of nearby projects based on the expected residual effects described in Sections 7 to 12.

Table 16.1: Potential for Cumulative Effects on Identified VCs

VC	Cumulative Effects Potential	Reasoning
Atmosphere and Air Quality	No	Project emissions are expected to remain below the maximum permissible ground-level concentrations.
Climate Change	No	Residual positive impacts regarding GHG emissions from the use of renewable energy resources will have a positive effect on climate change.
Sound	Yes	Construction and operational sound levels experienced by receptors are expected to comply with regulatory thresholds but may interact with nearby projects.

VC	Cumulative Effects Potential	Reasoning
Shadow Flicker	No	The potential for shadow flicker from Project turbines to interact with other wind projects was considered during shadow flicker modelling (no interactions are expected due to the physical separation of projects).
Geophysical Environment	Yes	If blasting is determined to be required for the Project, interactions with the geophysical environment may overlap with nearby projects.
Surface Water, Fish and Fish Habitat	No	The Project is maximizing the use of existing disturbed areas to minimize impacts to watercourses, and no surface water withdrawal will be required. In accordance with provincial permitting requirements, appropriate mitigations will be incorporated into the design of new watercourse crossings, such that there is no significant residual effect, and direct effects are limited to the Project Footprint.
Wetlands	Yes	The Project has been designed to minimize the overall disturbance footprint and maximizes the use of previously disturbed areas to reduce impacts to wetlands; however, impacts to wetlands, including potential WSS, are required for the Project. Residual effects on wetlands through permitted alterations during the development of the Project will be non-significant but may add to effects of nearby projects.
Terrestrial Vegetation Communities and Flora	Yes	Impacts to sensitive terrestrial vegetation communities and rare flora have been minimized through iterative Project design and the use of existing disturbed areas. However, habitat disturbance is expected through a large geographic area that may add to the effects of nearby projects.
Terrestrial Fauna	Yes	Habitat disturbance is expected through a large geographic area, and the effects of sensory disturbance may add to the effects from nearby projects.
Bats	Yes	The Project is predicted to have low and moderate non-significant impacts to bats through habitat loss and potential mortality, respectively. Effects may increase with effects from nearby projects.
Avifauna	Yes	The Project is predicted to have low to moderate and non-significant impacts on birds through habitat loss and potential mortality. Effects may increase with effects from nearby projects.
Economy	No	Residual impacts are anticipated to be positive.
Land Use	No	Residual impacts are anticipated to be negligible.
Archeological Resources	No	Avoidance of archaeological, historical, or culturally significant areas.

Based on Table 16.1, the following VCs are being considered for assessment of cumulative effects:

- Sound
- Geophysical Environment
- Wetlands

- Terrestrial Vegetation Communities and Flora
- Terrestrial Fauna
- Bats
- Avifauna

If, on review of other undertakings, there is no potential spatial and temporal overlap of project effects for a specific VC, then the VC may not be carried through the full CEA process. Similarly, if the pathways of cumulative effects are similar between VCs, then they may be grouped together in the CEA.

16.4 Selection of Spatial and Temporal Boundaries

The temporal boundaries of the CEA are based on expected duration of the three Project phases: site preparation and construction (5 years), operations and maintenance (35 years), and decommissioning and reclamation (18 months to 3 years). The spatial boundaries of the CEA are VC-specific and are based on the RAAs identified in Sections 7 to 12. The RAAs of the VCs selected for evaluation in the CEA are summarized in Table 16.2.

Table 16.2: Spatial Boundaries of VCs Considered for Cumulative Effects Assessment

Project VC	Section of EA (Effects Assessment)	VC-Specific RAA
Sound	Section 7.3.5	A 2.1 km buffer of selected turbine locations.
Geophysical Environment	Section 8.5	An 800 m buffer of the Project Footprint.
Wetlands	Section 9.1.5	The boundaries of secondary watersheds that intersect the Study Area.
Terrestrial Vegetation Communities and Flora	Section 9.2.5	A 5 km buffer of the Study Area.
Terrestrial Fauna	Section 10.2.5	The boundaries of ecoregions that intersect the Study Area, bounded by mainland Nova Scotia and the St. Mary's River.
Bats	Section 10.3.5	The boundaries of ecoregions that intersect the Study Area, bounded by mainland Nova Scotia and the St. Mary's River.
Avifauna	Section 10.4.7	The boundaries of ecoregions that intersect the Study Area, bounded by mainland Nova Scotia and the St. Mary's River.

16.5 Other Undertaking in the Area

16.5.1 Identification of Undertakings

Nearby projects for initial consideration in the CEA were identified based on the maximum extent of the VC-specific RAAs summarized in Table 16.2 (i.e., the RAA for terrestrial fauna, bats, and avifauna). This boundary, which represents the ecoregions that intersect the Study Area (bounded by mainland Nova Scotia and the St. Mary's River), was selected to allow for a comprehensive review of nearby projects with which the Project may have localized and/or widespread cumulative effects. The size of the selected boundary is consistent with current best practices (Hegmann et al., 1999; IAAC, 2023) and with typical spatial scales used in Nova

Scotia EAs for similar project types, while remaining sufficiently constrained for data analysis and meaningful analytical relevance.

In the CEA, both past and reasonably foreseeable undertakings within the selected boundary were considered. Past projects are those registered, approved, or constructed within the past 10 years, selected from the Environmental Assessment Projects Dashboard (NSECC, 2026a). Reasonably foreseeable future projects are those which have been registered with an EA document through NSECC but have not been approved or constructed. Note that the CEA conservatively assumes that all projects registered for EA will be constructed, unless their cancellation has otherwise been communicated.

There are seven proposed, three active, and one project under development near the Project that have been registered for EA or developed within the past 10 years (Drawing 16.1). There are several additional projects on the Environmental Assessment Projects Dashboard (NSECC, 2026a) in the selected boundary that have been proposed but are no longer considered for development, or have been developed over 10 years ago and are thus not considered in the CEA. Included amongst those that have been constructed are the Sable Wind Project and Mulgrave Community Wind Power Project. Both projects are active wind developments and were therefore included in the CEA despite being constructed greater than 10 years ago.

Existing and planned projects within the selected boundary are summarized in Table 16.3.

Table 16.3: Summary of Nearby Undertakings

Development Type	Project	Project Status	Activity Location	Distance from Study Area (km)
Energy	NSF Renewable Energy Park	Approved with Conditions	Goldboro	Within and adjacent to Study Area
Mining	Goldboro Gold Project	Approved with Conditions	Goldboro	Within and adjacent to Study Area
Other	Canso Spaceport Facility Project	Active	Canso	32 km east
	Melford International Terminal	Approved with Conditions	Melford	27 km northeast
Pit/Quarry	Black Point Quarry	Approved with Conditions	Black Point	24 km northeast
	Chedabucto Aggregates Quarry Expansion Project	Active	Halfway Cove	11 km northeast
	Loch Katrine Quarry Expansion Project	Active	Loch Katrine	24 km northwest
Wind Development	Aulds Cove Wind Project	Approved with Conditions	Aulds Cove	32 km northwest
	Goose Harbour Lake Wind Farm	Under Development	Lincolntonville	23 km northeast
	Upper Afton Wind Project	Approved with Conditions	Upper Afton	24 km north
	Setapuktuk Wind Project	Approved with Conditions	Middle Melford	23 km northeast
	Mulgrave Community Wind Power Project	Active	Mulgrave	43 km north
	Sable Wind Project	Active	Hazel Hill	32 km east

Following initial identification, the projects in Table 16.3 were screened against VCs selected for consideration in the CEA to determine if there is potential for both spatial and temporal overlap with the Project. Spatial overlap was determined for each selected VC by comparing the VC-specific RAA identified in Table 16.2 to the extent of anticipated effects on equivalent VCs described in project EA Registration Documents. Temporal overlap was assessed by comparing the temporal boundaries of the Project to the proposed timelines of nearby projects. Additional project details and their potential for interactions with the Project are described in the following subsections (project locations shown on Drawing 16.1 and 6.1).

Nova Sustainable Fuels Renewable Energy Park

The NSF Renewable Energy Park is a sustainable aviation fuel (SAF) production facility and associated infrastructure that will produce SAF, green methanol, and other low carbon co-products from biomass (Strum Consulting, 2025a). The project, which has an assessment area of approximately 247 ha, received EA approval in 2025 (NSECC, 2025f) but is not yet constructed. A 15 km freshwater pipeline associated with the NSF project is in the Study Area and overlaps Project access roads, and the SAF facility is located over 3 km from the nearest Project infrastructure. Based on the proximity of the Study Area to the NSF project, there is potential for localized interactions with the NSF Renewable Energy Park, though the physical separation of most Project infrastructure lessens the opportunities for many cumulative effects.

Goldboro Gold Project

The Goldboro Gold Project is planned to consist of an open pit mine with associated infrastructure including a 4,000 tonne per day processing facility, tailings management facility, waste rock storage areas, and till and organic material stockpiles (GHD, 2022). The project received EA approval in 2022 (NSECC, 2022d) and is in the process of development, reportedly preparing to begin work in 2026 (Canadian Mining Journal, 2025). The gold project area is approximately 410 ha, overlapping the southwestern portion of the Study Area, and is approximately 200 m from the nearest Project turbine and road. Based on the proximity of the Study Area to the Goldboro project, there is potential for localized interactions with the Goldboro Gold Project, though the physical separation of most Project infrastructure lessens the opportunities for many cumulative effects.

Canso Spaceport Facility

The Canso Spaceport Facility is a commercial rocket launch site located approximately 2 km south of the community of Canso. The project site includes 20 ha of land on which a launch control centre and various integration and processing facilities, launch area, and access roads are planned (Strum Consulting, 2018). The project received EA approval in 2019 (NSECC, 2019a), and initial construction of the project began in 2022 with site and infrastructure development on-going (Maritime Launch, 2026). Given the compact nature of the project (20 ha), the different pathways to effects, and the physical separation of the projects (approximately 32 km), there is limited potential for the Project to interact with the Canso Spaceport Facility.

Melford International Terminal

The Melford International Terminal is a proposed Marine Terminal in Middle Melford, along the Strait of Canso. The project, which received EA approval in 2008 (NSECC, 2008), includes the development of a deepwater port, rail container logistic terminal, and 34 km rail line (including 24 km of new rail and the reactivation of 10 km of historical rail bed), and 20 km transmission line. The project site is planned to occupy 217 ha of land, though it has yet to be developed. There is limited potential for the Project to have localized cumulative effects with the proposed Melford International Terminal due to the physical separation of the projects (27 km); however, there is potential for landscape-scale interactions due similarities in the pathways to terrestrial effects. For the purposes of this assessment, the Melford Terminal rail line is considered similar to a road, given its linear nature and relative scale.

Black Point Quarry

The Black Point Quarry is a proposed granite quarry and marine terminal that received EA approval in 2016 (NSECC, 2016a). The quarry site is planned to occupy approximately 180 ha of land with an additional 28 ha required for the processing plant, administration areas, and stockpiles (SLR Consulting, 2015). The project has yet to be developed but is in an active planning phase (Bruce, 2025). The scale of the Black Point Quarry indicates there may be potential for the Project to interact at a landscape-scale; however, given the generally compact (versus dispersed) nature of the infrastructure layout and separation of the projects (24 km) there is limited potential for widespread cumulative effects.

Chedabucto Aggregates Quarry Expansion Project

The Chedabucto Aggregates Quarry Expansion Project received EA approval in 2014 (NSECC, 2014a) for the consolidation and expansion of two existing quarry sites (Strum Consulting, 2014) and has been developed within the past 10 years. Considering the compact nature of the project footprint (11 ha), the different pathways to effects, and the physical separation of the projects (11 km), there is limited potential for the Project to interact with the Chedabucto Aggregate Quarry Expansion project.

Loch Katrine Quarry Expansion Project

The Loch Katrine Quarry Expansion Project is an expansion of an existing quarry operation in Antigonish County, northwest of the Project, that received EA approval in 2016 (NSECC, 2016b). The project includes a 42.5-ha study area with expanded quarry operations taking place within 27.3 ha; expansion of the quarry began around 2018 (H2O GEO Environmental Services, 2016). Based on the separation of the Project (24 km) and the compact footprint, there is limited potential for interactions with the Loch Katrine Quarry Expansion Project.

Aulds Cove Wind Project

The Aulds Cove Wind Project is an approved (NSECC, 2025b) wind project of up to 21 wind turbines. Located 32 km northeast of the Project, the Aulds Cove Wind Project encompasses a study area of approximately 1,417 ha, with a project footprint of roughly 64 ha. Planned infrastructure includes approximately 11.9 km of new road construction, widening and improvements to approximately 2.7 km of existing roads, substations and operations buildings,

electrical collection system, transmission line, temporary laydown and turbine pad yards (Strum Consulting, 2025d). Initial site clearing for the project is expected to begin in 2026. The similar pathways to effects between the Project and the Aulds Cove Wind Project indicates there is potential for landscape-scale, though the potential for localized cumulative effects are limited due to the physical separation of the projects (32 km). Goose Harbour Lake Wind Project The Goose Harbour Lake Wind Farm Project is a 130 MW wind project registered and approved in 2023 (NSECC, 2023a) and currently under construction. The EA was approved based on the proposed construction of 29 wind turbines requiring approximately 65 km of roads (12 km of new roads and 53 km of upgrades to existing roads) (Strum Consulting, 2023). The project has a study area of approximately 9,428 ha, a project footprint of approximately 209 ha, and is directly south of the Aulds Cove Wind Project. Like the Aulds Cove Wind Project, the Project has similar pathways to effects and landscape-scale interactions are possible, but there is limited potential for localized cumulative effects with the Goose Harbour Lake Wind Farm Project (the projects are 23 km apart).

Mulgrave Community Wind Power Project

The Mulgrave Community Wind Power Project is 2.35 MW single turbine development constructed near Mulgrave approved in 2014 (NSECC, 2014b) and constructed in 2015. The turbine is located at the end of an existing 1 km road on private land, with a laydown area of approximately 0.8 ha around the turbine location (McCallum Environmental Ltd., 2014). There is limited potential for localized cumulative effects with the Mulgrave Community Wind Power Project (the projects are 43 km apart). There is limited potential for widespread effects based on the scale of the Project.

Sable Wind Project

The Sable Wind Project is a 13.8 MW wind project consisting of six wind turbines registered in 2012 and approved in 2013 (NSECC, 2013). It was commissioned in 2014 under shared ownership between MODG and Nova Scotia Power Incorporated. It is located in Hazel Hill, south of the community of Canso. Approximately 4 km of road were constructed as part of the project. There is limited potential for localized cumulative effects with the Mulgrave Community Wind Power Project (the projects are 32 km apart). There is limited potential for widespread effects based on scale of the Project.

Setapuktuk Wind Project

The Setapuktuk Wind Project is a wind project with 54 wind turbines that received EA approval in 2025 (NSECC, 2025h). The project's 8,880-ha study area is northwest of the Project and directly southwest of the Goose Harbour Lake Wind Farm Project. The project footprint includes 273 ha of land within which 44 km of new road development and upgrades to 35 km of existing roads are planned (Strum Consulting, 2025c). Initial site clearing for the project is expected to begin in late 2026. Landscape-scale interactions with the Setapuktuk Wind Project are possible based on the similar pathways to effects, though opportunities for localized effects are limited (the projects are 23 km apart).

Upper Afton Wind Project

The Upper Afton Wind Project is an up to 176 MW wind development consisting of up to 28 turbines that received EA approval in 2026 (NSECC, 2026b). Initial site clearing for the project is expected to begin as soon as late 2026 (Strum Consulting, 2025b). The project includes a 4,961-ha study area and 219-ha project footprint. A total of 51 km of upgrades to existing access roads and construction of 15 km of new access roads are expected (Strum Consulting, 2025b). The Project has similar pathways to effects as the Upper Afton Wind Project, indicating there is potential for project effects to interact, though the separation of the projects will limit the potential for localized cumulative effects (the projects are 24 km apart).

16.5.2 Potential for Interactions

Table 16.4 summarizes potential for the Project to interact with the effects of nearby developments based on potential for spatial and temporal overlap, and pathways to residual effects on each selected VC.

Table 16.4: Potential for Interactions with Nearby Undertakings

Project	Sound	Geophysical Environment	Wetlands	Terrestrial Effects	Avian Mortality
NSF Renewable Energy Park	Yes	Yes	Yes	Yes	No
Goldboro Gold Project	Yes	Yes	Yes	Yes	No
Canso Spaceport Facility Project	No	No	No	No	No
Melford International Terminal	No	No	No	Yes	No
Black Point Quarry	No	No	No	No	No
Chedabucto Aggregates Quarry Expansion Project	No	No	No	No	No
Loch Katrine Quarry Expansion Project	No	No	No	No	No
Aulds Cove Wind Project	No	No	No	Yes	Yes
Goose Harbour Lake Wind Farm	No	No	No	Yes	Yes
Mulgrave Community Wind Power Project	No	No	No	No	No
Sable Wind Project	No	No	No	No	No
Setapuktuk Wind Project	No	No	No	Yes	Yes
Upper Afton Wind Project	No	No	No	Yes	Yes

Based on a review of project descriptions and pathways to environmental effects, there is limited potential for the Project to interact with the effects of the Canso Spaceport Facility Project (Strum Consulting, 2018), the Chedabucto Aggregates Quarry Expansion Project (Strum Consulting, 2014), the Black Point Quarry (SLR Consulting, 2015), and the Loch Katrine Quarry Expansion Project (H2O GEO Environmental Services, 2016). The types of activities associated with all four projects indicate that the main pathways to environmental effects include sound (and sensory disturbance), interactions with groundwater resources, and

atmospheric emissions. The Project RAAs for these VCs are over 10 km from these projects, such that there is limited potential for the Project to have a cumulative effect. These projects are therefore not considered further.

Additionally, there is limited potential for the Project to act cumulatively with the Mulgrave Community Wind Power Project and the Sable Wind Project across all VCs due to the proximity and scale of those developments. These projects are therefore not considered further.

The potential for cumulative effects to the geophysical environment, particularly groundwater resources, was initially considered but was screened out of the CEA. The pathway for the Project to interact with the effects of nearby projects on the geophysical environment is limited to the potential use of blasting to support the construction of turbines and roads, which will be confirmed during geotechnical investigations and detailed engineering design, post-EA approval. The Goldboro Gold Project will regularly require drilling and blasting during operations (GHD, 2022), and blasting may be required for the structural components of the NSF Renewable Energy Park (Strum Consulting, 2025a). However, blasting for the Goldboro Gold Project and NSF Renewable Energy Park (if required) would occur over 1 km from Project RAA for the geophysical environment, and it is therefore unlikely that blasting for the Project (if determined to be required) will add to the potential effects of these projects. Further, there is no pathway for cumulative effects on groundwater wells as nearby projects do not overlap any of the groundwater wells identified in the Project RAA for the geophysical environment (Drawings 8.4 to 8.7). The Proponent has begun the process of engaging with the proponents of the Goldboro Gold Project and NSF Renewable Energy Park (Section 6.2.5), and future engagement about the construction process will occur as the projects progress.

Finally, it is important to recognize that the projects identified in Table 16.4 are situated in a mosaic of land cover types and uses, including intact and disturbed forests, timber harvesting operations, intensive agricultural land, communities, and residential developments. While these activities all affect the landscape and usage of lands by humans and other species, general land use is not accounted for as “other undertakings” in the CEA as there is not a meaningful way to determine or quantify the effect of these activities on various VCs. Furthermore, the existing land use was considered in the determination of residual environmental effects for each VC within the Project’s EA Registration Document, so no additional conclusions can be made through the lens of a CEA.

16.6 Cumulative Effects Assessment

Cumulative effects for the Project were assessed by considering potential residual effects (as identified in VC sections) in relation to past, existing, and reasonably foreseeable future activities within the area surrounding the Project (i.e., projects currently under regulatory review, approval, or construction; identified in Table 16.4). Pathways to cumulative effects were found to be similar among terrestrial vegetation communities and flora, terrestrial fauna, and habitat for avifauna and bats. Likewise, pathways are similar between bird and bat mortality. These VCs are therefore grouped for the purposes of the CEA, such that impacts are collectively evaluated under “Terrestrial Effects” and “Avian Mortality”.

For the VCs carried forward through the CEA, the effects of assessed projects have been quantified when possible; however, differences in available data, study boundaries, and assessment methodologies among projects limit the extent to which quantitative comparisons can be made. As such, the potential cumulative effects of these projects are evaluated primarily through a qualitative assessment.

16.6.1 Sound

Effects on the acoustic environment are discussed in terms of pathways to cumulative effects with the following projects:

- Goldboro Gold Project
- NSF Renewable Energy Park

The Project RAA for sound (Figure 1, Appendix E) overlaps with LAAs of the Goldboro Gold Project (GHD, 2022, p. 109) and NSF Renewable Energy Park (Strum Consulting, 2025a, p. 110) for noise, and all projects overlap temporally based on reported project timelines. Therefore, further examination of the potential for sound produced by the three projects to act cumulatively on one or more receptors is warranted. The potential for sound-related project interactions to impact terrestrial fauna through sensory disturbance are discussed in Section 16.6.4.

The residual effects of the Project on the acoustic environment are outlined in Section 7.3. These effects are assessed to be of low magnitude and are considered not significant. The potential for sound produced by the Project to interact with nearby projects will primarily occur during the construction of roads and turbines, as sound levels will be greatly reduced during the operations phase which will limit the potential for cumulative effects. Because of the non-linear nature of the addition of two unique sound sources (Baker, n.d.), it is not possible to quantify the potential for cumulative effects without additional study that takes into account the specific point sources and levels of noise from each project. It is possible, however, to examine the modelled areas of effects of nearby projects in relation to the sound produced by the Project to determine the likelihood of a cumulative effect on an identified receptor that exceeds regulatory guidance. Of the receptors identified in the Project RAA for sound, receptors on the west side of Ocean Lake are the closest to the Goldboro Gold Project and NSF Renewable Energy Park and therefore have the highest potential to experience cumulative effects due to sound.

The highest noise emissions produced by the Goldboro Gold Project will be associated with drilling and blasting which will regularly be required during project operations. Noise emissions for the project are expected to be within acceptable levels for all residential receptors (GHD, 2022), and modelling indicates that the greatest noise emissions from the Goldboro Gold Project (GHD, 2022, p. 113) are not expected to overlap the Project RAA for sound in the area of any identified receptors, including those around Ocean Lake (shown in Figure 1, Appendix E).

Most noise emissions associated with the NSF Renewable Energy Park will occur in the vicinity of the SAF facility and are not expected to be noticeable by receptors in the Project RAA for sound, including those around Ocean Lake who are located over 5 km away (Strum Consulting, 2025a). There is potential for construction noise associated with the freshwater pipeline to be discernable to receptors around Ocean Lake, but sound levels will be low due to the separation of project activities [> 830 m to nearest receptor (Strum Consulting, 2025a)].

Based on the results of project-specific sound modelling and estimates, and the large separation between noise-generating activities, it is unlikely that sound levels will act together to exceed regulatory thresholds at the locations of identified receptors. All three projects have planned mitigations to manage sound levels and have committed to developing and implementing a noise complaint resolution process should unacceptably high noise levels occur. Further study of the potential for cumulative effects related to sound is not considered necessary.

16.6.2 Wetlands

Wetland impacts are discussed in terms of pathways to cumulate effects with the following projects:

- Goldboro Gold Project
- NSF Renewable Energy Park

The Project RAA for wetlands overlaps both projects and all projects have temporal overlap based on reported timelines, indicating there is potential for a cumulative effect on wetlands. The potential effects of the Project on wetlands through habitat loss and changes in wetland function are outlined in Section 9.2. These effects are predicted to be of moderate and low magnitude; no watershed-scale changes are anticipated, and the effect is evaluated as not significant.

The southwestern extent of the Project Study Area and RAA for wetlands coincides with four secondary watersheds in which wetlands are expected to be directly and indirectly impacted by the Goldboro Gold Project and/or NSF Renewable Energy Park (1EQ-SD31, 1EP-1, 1EP-SD1, 1EQ-SD29; secondary watersheds shown on Drawing 9.4). Though residual effects of each project on wetlands were determined to be not significant, they will each add to the total impacted area within overlapping watersheds. Data about the extent of direct impacts to wetlands have been included in the EA Registration Documents of each project, and it is therefore possible to assess the potential for cumulative effects on wetlands by determining the total loss of wetland habitat within overlapping watersheds.

Out of a total 222 wetlands delineated within the Goldboro Gold Project's assessment area, impacts are expected to 112 wetlands, 56 of which are direct effects (total impact area 91 ha), and 56 of which are indirect (GHD, 2022, p. 295). A total of 83 wetlands were delineated for the NSF Renewable Energy Park (Strum Consulting, 2025a, p. 176), with direct impacts to 73 wetlands expected (total impact area of 26 ha). As wetland alterations were not reported by

watershed boundary in the EA Registration Documents, the described impacts associated with the Goldboro Gold Project and NSF Renewable Energy were estimated for overlapping secondary watersheds qualitatively comparing mapped wetlands against the known boundaries of secondary watersheds (NSECC, 2011b).

As shown in Table 16.5, the majority of impacts associated with the Goldboro Gold Project will occur in the 1EQ-SD31 (Gold Brook Shore-Direct) secondary watershed, with direct impacts from the NSF Renewable Energy Park also concentrated in this watershed. Based on the total amount of wetland habitat in this watershed [derived from the NSNR Wetlands Inventory (NSNR, 2021k)], an estimated 13.1% of all wetlands are expected to be impacted by the three projects. Wetland impacts in 1EQ-SD31 due to the Project are expected to be low, totaling 0.9 ha (Table 16.5; the watershed least impacted by the Project of the four overlapping watersheds), and the Project will increase the area of direct impacts by 0.87%. Of the remaining shared watersheds that overlap with nearby projects, direct impacts due to the Project will be highest in the 1EQ-4 (New Harbour River) secondary watershed, which will experience relatively low impacts from nearby projects. Combined impacts to watersheds 1EQ-SD29 (Coddles Harbour Shore-Direct) and 1EP-1 (Isaacs Harbour River) are also expected to be low.

Table 16.5: Estimated Extent of Direct Impacts to Wetlands in Shared Secondary Watersheds

Secondary Watershed	Estimated Direct Wetland Impacts (ha)			Total Wetland Impact (ha)	Percentage of Total Wetland Area Impacted ⁽²⁾
	Ocean Lake Wind Project ⁽¹⁾	Goldboro Gold Project	NSF Renewable Energy Park ⁽¹⁾		
1EP-1	4.5	0.1	0.8	5.4	0.7
1EQ-4	19.0	2.2	3.6	24.8	3.0
1EQ-SD29	2.7	0.2	0.0	2.9	0.6
1EQ-SD31	0.9	88.1	15.7	104.7	13.1

⁽¹⁾Additional direct impacts are expected outside of identified watersheds

⁽²⁾Total wetland area estimated from the NSNR Wetlands Inventory (NSNR, 2021k). Note that provincial wetland mapping is less detailed than field delineations, such that percentage-based impacts are conservative overestimates.

The proximity of planned wetland alterations suggests that some localized effects may occur within overlapping watersheds due to the combined effects of the three projects (e.g., due to habitat loss, changes in wetland functionality). However, the wetland alterations required for nearby projects are concentrated in a secondary watershed (1EQ-SD31) that will see minor direct impacts due to the Project. Similarly, in watersheds where Project impacts to wetlands will be higher, the impacts of nearby projects will be small. The separation of most Project impacts to wetland habitat from the impacts of the Goldboro Gold Project and NSF Renewable Energy Park is such that the added effects of the Project are expected to be of low magnitude and not considered significant. The potential for cumulative effects will be managed through provincial permitting and approval processes in accordance with the *Environment Act* (Nova Scotia, 1995b) that are required for all wetland alterations in Nova Scotia. Nova Scotia's Wetland Conservation Policy (NSECC, 2019b) requires compensation for wetland alterations (for example, wetland restorations), that will ensure no net loss in wetland area and function.

16.6.3 Terrestrial Effects

Terrestrial effects are discussed in terms of pathways to cumulative effects with the following projects:

- Goldboro Gold Project
- NSF Renewable Energy Park
- Melford International Terminal
- Aulds Cove Wind Project
- Goose Harbour Lake Wind Farm Project
- Setapuktuk Wind Project
- Upper Afton Wind Project

The Project RAAs for terrestrial VCs have varying degrees of spatial overlap with these projects, and all projects have temporal overlap based their long operational timeframes. For instance, the Project directly overlaps the Goldboro Gold Project and NSF Renewable Energy Park, indicating there may be potential for localized terrestrial effects due to the combined effects of the projects. While the physical separation of the remaining projects suggests there are limited pathways for localized interactions (all are located over 20 km from the Project Study Area), there is potential for the Project to add to the effects of other projects on landscape-scale processes through habitat loss and fragmentation.

The CEA for terrestrial effects considered the two main pathways for cumulative effects: habitat loss and alteration, and sensory disturbance to terrestrial fauna, bats, and avifauna. Because the types of cumulative effects resulting from interactions with overlapping projects differ from those located further away, pathways to cumulative effects due to habitat loss and alteration are discussed in terms of localized as well as landscape-scale effects.

16.6.3.1 *Habitat Loss and Alteration*

Potential for Localized Cumulative Effects

The Project RAA for terrestrial vegetation communities and flora overlaps the Goldboro Gold Project and NSF Renewable Energy Park. The impacts to land cover types reported in EA Registration Documents serve as a useful basis for determining the extent of combined, localized loss of terrestrial habitat associated with the projects. Table 16.6 summarizes the amount of each land cover type expected to be directly impacted by the three projects (i.e., area within the clearing or project footprint, as applicable to each project), contextualized by the amount available within the RAA for terrestrial vegetation communities and flora.

Table 16.6: Localized Impacts to Land Cover Types

Land Cover Type	Estimated Area of Impact (ha)					Percentage Impacted (%)
	Ocean Lake Wind Project	Goldboro Gold Project ⁽¹⁾	NSF Renewable Energy Park	Total Area Impacted	Amount Available in RAA	
Hardwood Forest	107.3	0.0	0.5	107.8	4,107.3	2.6
Hardwood Wet Forest	2.9	2.5	0.0	5.4	127.4	4.2
Mixedwood Forest	100.9	76.3	12.0	189.2	4,852.0	3.9
Mixedwood Wet Forest	6.4	0.0	1.1	7.5	312.0	2.4
Softwood Forest	378.1	167.8	30.9	576.8	16,432.4	3.5
Softwood Wet Forest	68.3	84.5	5.5	158.3	3,081.3	5.1
Shrubs and Alders	52.5	0.0	6.3	58.8	1,829.4	3.2
Open Wetland	31.8	11.1	6.5	49.4	4,774.2	1.0
Cutover Upland	321.4	41.0	39.6	402.0	6,008.2	6.7
Cutover Wetland	6.3	3.1	1.5	10.9	287.7	3.8
Urban/developed	25.5	19.2	4.8	49.5	1,195.3	4.1
Open Areas	612.4	5.0	135.4	752.8	13,475.6	5.6
Water	2.2	0.3	2.5	5.0	4,082.8	0.1
Total	1,605.8	408.3	246.7	2,260.8	60,565.6	3.7⁽⁴⁾

Source: Goldboro Gold Project (GHD, 2022); NSF Renewable Energy Park (Strum Consulting, 2025a)

⁽²⁾Land cover types reported for the Goldboro Gold Project were recategorized to a common scheme for the CEA

⁽³⁾Percentage of land cleared relative to the total size of the RAA for terrestrial vegetation communities and flora.

Percentages that are higher/lower than this value represent disproportionately high/low impacts.

The combined footprints of the three projects consist of 2,260.8 ha of land, which represents 3.7% of the Project RAA for terrestrial vegetation communities and flora (Table 16.6). Open areas (752.8 ha) and softwood forests (576.8 ha) (and therefore the species that use these land cover types as habitat) will experience the highest combined impacts. Each project has, to various degrees, prioritized the use of existing disturbed areas, such that 20.6% of the combined footprints represent cutovers and/or urban/developed land.

Though the sites selected for the Goldboro Gold Project and NSF Renewable Energy Park have already been heavily disturbed by past land uses [as shown in Table 16.6 and described in GHD (2022) and Strum Consulting (2025a)], a variety of flora, fauna, and avian species have been observed to use these areas, indicating they continue to hold habitat value for some species. Based on similarities in ecological characteristics with the Project and reported results of biophysical surveys, there is a degree of overlap in the species that will be impacted by the combined effects of the projects on terrestrial habitat. For instance, of the flora SAR with potential to interact with the Project, impacts to frosted glass-whiskers (SARA Special Concern, S-Rank S3S4) and/or blue felt lichen (SARA Special Concern, ESA Vulnerable, S-Rank S3) have also been identified for the Goldboro Gold Project and NSF Renewable Energy Project. Though most direct interactions between the Project and flora SAR are expected to be avoidable, it is possible that the Project may add to indirect impacts to rare lichens that are expected to result from nearby projects [e.g., a total of 178 blue felt lichen thalli are planned to

be directly impacted by the Goldboro Gold Project with an additional 225 in the project area (GHD, 2022, p. 433); indirect impacts to four occurrences of blue felt lichen are associated with the NSF Renewable Energy Park with no direct impacts expected (NSECC, 2025f, p. 205)].

Of the fauna species considered, mainland moose were identified as a priority species by all three projects and may experience localized effects due the combined impacts of habitat loss and fragmentation. A comparison of the results of habitat modelling completed for the Project to the sites of the Goldboro Gold Project and NSF Renewable Energy Park indicates, however, that these projects will primarily result in the loss of poor or fair quality habitat such that a cumulative effect due to habitat loss is expected to be of low magnitude.

As described in Section 10.2, the Project also has potential to contribute to habitat fragmentation for mainland moose and other fauna species that show preference for intact habitats due to road construction and upgrades. Nearby projects will require a relatively low amount of new road construction (totaling approximately 8.7 km) which will primarily be limited to the respective project sites; however, both projects will require permitter fencing around sensitive areas (e.g., SAF facility, open pit mines, processing areas) which can be expected to alter the movement and use of habitat by fauna (GHD, 2022; Strum Consulting, 2025a). Fencing for the Project will be limited to the permitter of substations, such that the Project will not add further physical restrictions to the movement of many fauna species (though roads may pose a physical barrier to some species, as described in Section 10.2). Though the Project will add to the habitat fragmentation and edge effects associated with these projects, differences in the types of disturbance patterns (e.g., compact versus dispersed project footprints) will limit the potential for localized cumulative impacts.

Habitat impacts to several species of priority avifauna considered by the Project were also identified for the Goldboro Gold Project and NSF Renewable Energy Park. The combined impacts of the three projects on Canada warbler, olive-sided flycatcher, barn swallow, and rusty blackbird habitat are presented in Table 16.7.

Table 16.7: Direct Impacts to Avifauna SAR Habitat

Avifauna SAR	Direct Impact Area (ha)				Amount Available in Avifauna LAA (ha)	Percentage Impacted (%)
	Ocean Lake Wind Project	Goldboro Gold Project	NSF Renewable Energy Park ⁽¹⁾	Total		
Canada warbler	19	104	191	314	15,343	2
Olive-sided flycatcher	3	344	56	403	6,885	6
Barn Swallow	45	NA	295	340	16,555	2
Common Nighthawk	41	NA	136	177	14,779	1
Rusty Blackbird	5	NA	NA	5	3,743	< 1

⁽¹⁾Values for NSF Renewable Energy Park are reported for the entire project assessment area (i.e., 1,030 ha), which is considerably larger than the expected project footprint (i.e., 247 ha), and therefore overestimates the total area impacted.

In addition to the impacts of the Project, impacts Canada warbler (SARA Threatened, ESA Endangered, S2S3B) and olive-sided flycatcher (SARA Special Concern, ESA Threatened, S3B) habitat were also identified for the Goldboro Gold Project and NSF Renewable Energy Park, and to impacts to barn swallow (SARA Threatened, ESA Endangered, S3B) and common nighthawk (SARA Special Concern, ESA Threatened, S3S4B) habitat were identified for NSF Renewable Energy Park (Table 16.7). The combined impacts of the projects on suitable habitat for these species is expected to be low relative to the amount of habitat modelled in the Project LAA for avifauna (described in Section 10.4). The potential for the Project to have a localized cumulative effect varies based on the species' sensitivity to disturbance. For instance, species such as Canada warbler may be impacted by the combined impacts to wetland habitat (described further in Section 16.6.2), whereas species such as barn swallow may adapt to and make use of constructed features. In general, species that are adapted to or frequently use fragmented habitats, such as olive-sided fly catcher and common nighthawk will be less sensitive to the combined impacts of habitat fragmentation than species requiring intact forest cover.

Various land use and wildlife habitat considerations have been incorporated into the siting of each of the three projects discussed above, which has helped to reduce the overall potential for cumulative effects on the terrestrial environment. All projects are expected to or have been required to, as a condition of EA approval, develop a Wildlife Management Plan and/or Adaptive Management in consultation with NSNR, NSECC, and ECCC that provides a mechanism for addressing the potential for cumulative effects on terrestrial flora, fauna, and avian species, as applicable.

Potential for Widespread Cumulative Effects

The potential for widespread impacts to terrestrial habitat and species are considered a pathway to cumulative effects with the Goldboro Gold Project, NSF Renewable Energy Park, Melford International Terminal, Aulds Cove Wind Project, Goose Harbour Lake Wind Farm Project, Setapuktuk Wind Project, Upper Afton Wind Project. These projects have spatial overlap with the Project RAA for terrestrial fauna, bats, and avifauna (Table 16.4) and overlap temporally based on the reported project timelines. These projects also have relatively large study areas and dispersed footprints, indicating there is potential for a cumulative effect related to habitat loss and fragmentation.

Habitat loss and fragmentation across large spatial scales is known to impact the movement, behaviour, and population dynamics of many species (Beazley et al., 2004; Katzner et al., 2025), though different lifeforms and species are likely to vary in their degree of sensitivity to landscape-scale processes. Though each project is expected to impact a low proportion of terrestrial habitat within their respective assessment boundaries, across the seven projects selected for consideration of widespread terrestrial effects, a total of 4,111 ha of terrestrial habitat is expected to be impacted.

Each project has endeavoured to maximize the use of existing disturbed areas including roads and rail lines (e.g., the Melford International Terminal) to reduce the amount of new

disturbance and habitat fragmentation required. Across all seven projects, a total of 245 km of new road/rail is planned to be developed, with upgrades to an additional 246 km of existing infrastructure required. Of this, the road development for the Project represents 53% of new development, indicating that the Project will add to the effects of road density related to planned developments. It is possible that flora species adapted to the attributes of interior habitats, such as a shade-adapted plants and many species of rare lichens, may experience widespread impacts due to the development of linear features. The spread and propagation of flora species across the landscape, which occurs over extended timescales, may also be disrupted by changes in habitat connectivity and animal-mediated dispersal. In relation to avian species, the sites of the four assessed wind projects are known to be used by a variety of bird and bat species for migration, breeding, and foraging purposes. The coastline of Nova Scotia is known as a fly-way during migration and it is evident that birds utilize the various habitats found in these and the surrounding areas for various needs (i.e., foraging, migratory stop-overs, etc.) (*Migratory Bird Program Administrative Flyways* | U.S. Fish & Wildlife Service, 2025). There is potential for the Project to add to habitat loss and fragmentation for avifauna as they may be reasonably expected to migrate across project boundaries. In particular, habitat fragmentation across a large geographic area may impact migrating birds searching for suitable stopover habitat. While it is likely that the Project, due to its overall scale, will contribute to these landscape scale impacts, it is not currently possible to determine the extent to which the Project adds to the impacts of nearby activities due to lack of population data and monitoring that extends well beyond the boundaries of the Project.

Widespread impacts to terrestrial fauna are also possible through the effects of habitat loss and fragmentation, particularly for wide ranging species such as mainland moose. Mainland moose require a variety of terrestrial habitats to meet life stage requirements and are known to be highly sensitive to the impacts of habitat loss and fragmentation, including through road development (Beazley et al., 2004; NSNR, 2021j). Each of the seven projects identified for assessment of widespread terrestrial effects is located within core habitat identified for the Pictou-Antigonish-Guysborough subpopulation of mainland moose and have potential to cause habitat loss and fragmentation. As described in Section 10.2, a low amount of suitable habitat for mainland moose is expected to be lost due to the Project indicating that cumulative effects related to the Project due to habitat loss are likely to be low. Importantly, the Project is separated from other wind projects by the Milford Haven River and nearby coastal waters such that individual moose are unlikely to experience the combined effects of habitat loss and linear development of multiple wind developments. The Project may be required, as a condition of EA approval, to complete monitoring for mainland moose, which would serve as a means to identify and manage impacts on this species.

Based on the above, the scale of the combined developments indicates there is potential for a cumulative effect to occur due to widespread habitat loss and alteration. The Proponent has committed to developing a Terrestrial Habitat and Wildlife Management Plan in consultation with NSNR, NSECC, and ECCC, which is also expected to be a condition of EA approval. As the Proponent of the Project is also the proponent of the Setapuktuk Wind Project and Upper Afton Wind Project, there will be opportunities to directly assess the results of post-construction

wildlife monitoring within the context of the results of these nearby projects. These mechanisms and project-specific mitigations will help to address the potential for cumulative effects due to habitat loss and alteration.

16.6.3.2 Sensory Disturbance

Sensory disturbance is discussed in terms of pathways to cumulative effects with the following projects:

- Goldboro Gold Project
- NSF Renewable Energy Park to the Project

The primary pathways to sensory disturbance on terrestrial fauna, bats, and avifauna with these projects is through the production of noise and light. The physical separation of the remaining projects identified for assessment of terrestrial effects is such that there is limited potential for interactions with sensory disturbance related to the Project.

Sensory disturbance due to the Project, and thus the potential for cumulative effects, will be highest during the construction phase when noise levels and the presence of site personnel will be greatest. Both the Goldboro Gold Project and NSF Renewable Energy Park expect sensory disturbance to result in some level of avoidance behaviour by wildlife species during periods of elevated activity (e.g., construction, drilling and blasting, hauling, processing and operations of the mine site and SAF facility; GHD, 2022; Strum Consulting, 2025c), and it is possible that wildlife avoiding nearby projects due to noise and elevated activity could also encounter and be impacted by sensory disturbance associated with the Project. However, the construction of the Project will progress across the Project Footprint (as opposed to occurring in all areas at once) and will be of limited duration, which will reduce the potential for the Project to have a cumulative effect. During the operations phase of the Project, noise levels will be greatly reduced and are unlikely to have a significant cumulative effect with nearby projects.

All three projects will introduce new sources of artificial lighting that may cause sensory disturbance and/or disorientation for terrestrial fauna, bats, and avifauna. Safety lighting will be required during the construction of the Goldboro Gold Project and will be used throughout the project site during operations (GHD, 2022, p. 102). Lighting will also be used during the construction of the NSF Renewable Energy Park and required for operations, though no lighting will be installed along the freshwater pipeline to Ocean and Meadow lakes (Strum Consulting, 2025a, p. 235). As described in Section 10.1.6, lighting during Project construction will be limited to the amount required for the safety of personnel and will be minimal during the operations phase. Therefore, there is limited potential for the Project to add the localized effects of lighting associated with nearby projects.

The Proponent has committed to developing a Terrestrial Habitat and Wildlife Management Plan in consultation with NSNR, NSECC, and ECCC, which is also expected to be a condition of EA approval. Such plans are also required for NSF Renewable Energy Park (NSECC, 2025f) and the Goldboro Gold Project (NSECC, 2022d), with the gold project also required to

develop a lighting management plan and noise mitigations to reduce impacts on fauna. Considering the small area of overlap with the effects of nearby projects and the temporary, localized, and intermittent nature of the Project's construction activities, no additional mitigation measures for sensory disturbance are expected to be necessary.

16.6.4 Avian Mortality

Effects on avian mortality are discussed in terms of pathways to cumulative effects with the following projects:

- Goose Harbour Lake Wind Farm Project
- Aulds Cove Wind Project
- Setapuktuk Wind Project
- Upper Afton Wind Project

The Project RAA for avifauna and bats overlaps each of these projects, and given the long operating life of wind projects, temporal overlap is also expected. Though additional undertakings are located closer to the Project (e.g., Goldboro Gold Project, NSF Renewable Energy Park), the shared pathways to avian mortality are limited due to the different types of planned developments. The potential for avian mortality associated with all selected projects is primarily associated with the possibility of bird and/or bat strikes with turbine blades.

The Goose Harbour Lake Wind Farm Project currently under construction, includes 29 wind turbines and ancillary infrastructure. While the EA Registration Document did present a summary of migratory bird interaction index, (likely activity based on the fall 2022 migratory period which may correlate to increased mortality), no estimate of mortality was presented. Post-construction mortality monitoring is required but has not yet been completed as turbines are not yet in operation. Similarly, the 21-turbine Aulds Cove Wind Project and 54-turbine Setapuktuk Wind Project located adjacent to the Goose Harbour Lake Wind Farm Project, and the 28-turbine Upper Afton Wind Project did not include avian mortality estimates in their assessments but will undertake post-construction mortality monitoring as required by their approvals.

Given the proximity of nearby wind projects and combined number of turbines (up to 132 planned turbines in addition to up to 158 Project turbines), there are likely additive effects to avian mortality. With the lack of publicly available post-construction mortality data, it is not possible to determine whether or the degree to which any additive cumulative effects would result in a significant impact to avian mortality. Each project indicated that there is potential for avian mortality, though each deemed the effect to be not significant within the spatial boundaries of each respective EA Registration Document.

Wind projects requiring an EA in Nova Scotia are required to complete two years of post-construction mortality monitoring for birds and bats. In addition, it is expected that the Project will be required, as a condition of EA Approval, to develop an Adaptive Management Plan that includes a decision-making process to mitigate potential impacts to bird and bat species during

operations. The plan and the monitoring results will be reviewed by NSECC, NSNR, and ECCC. NSECC would also receive the post-construction monitoring results from the Goose Harbour Lake Wind Farm Project, Aulds Cove Wind Project, Setapuktuk Wind Project, and Upper Afton Wind Project. Further, recent wind EA Approval conditions note NSECC's ability to require additional mitigation as part of adaptive management. Therefore, the potential for cumulative effects will be managed through future requirements for monitoring and adaptive management, as required.

16.7 Cumulative Effects Assessment Summary

The CEA applied a structured approach consistent with established guidance documents (Government of British Columbia, 2024; Hegmann et al., 1999) to identify relevant VCs, define appropriate spatial and temporal boundaries, and assess the combined influence of the Project and other existing or foreseeable activities. This process also incorporated an acknowledgment of uncertainties associated with data gaps and the limited availability of publicly available information for other developments.

Based on the CEA analysis and given the relative separation of project many activities from each other and nearby receptors, no significant cumulative effects relating to sound or the geophysical environment are expected. The direct impacts to wetlands associated with nearby projects may result in some localized interactions within overlapping secondary watersheds; however, direct impacts are not expected to be significant at the watershed scale and unimpacted wetland habitat will remain abundant within the Project RAA for wetlands. Wetland alterations completed for all project will require compensation under the Nova Scotia's Wetland Conservation Policy (NSECC, 2019b). The Project is expected to add to the effects of nearby projects on the terrestrial environment, including impacts to terrestrial habitats and through sensory disturbance. Siting considerations have helped to reduce the magnitude of localized and widespread effects, and the potential for cumulative effects will be further managed through post-construction monitoring (e.g., for mainland moose). Although potential cumulative effects on avifauna remain uncertain due to limited regional mortality data, required post-construction monitoring will provide a mechanism to detect and respond to any emerging cumulative impacts. Overall, the CEA indicates that cumulative effects for the relevant VCs are expected to be low and not significant and can be effectively managed through project-related mitigation and ongoing monitoring. No additional mitigation measures or monitoring is recommended based on the cumulative effects assessment.

17.0 CONCLUSION

In accordance with A Proponent's Guide to Environmental Assessment (NSECC, 2025a), the studies, regulatory assessments and VC evaluations described within this EA Registration Document have been considered both singularly and cumulatively, for all phases of the Project.

The results of this assessment indicate that in consideration of the Project's mitigative and protection measures, adverse residual effects are anticipated to be not significant.

18.0 CLOSURE

This EA Registration Document was completed by Strum Consulting, an independent, multi-disciplinary team of consultants with extensive experience with submission of EA Registration Documents for undertakings within Atlantic Canada. Curriculum vitae for report contributors and Strum Project Team members are provided in Appendix R. A list of the Project Team and their associated roles is provided below.

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APPENDIX A

PROJECT PIDS

strum
CONSULTING


PID	Ownership	Within Project Footprint
35122431	Private	Y
35122449	Private	Y
35123058	Private	Y
35148626	Road	Y
35148675	Road	Y
35148683	Road	Y
35148691	Road	Y
35149566	Road	N
35149582	Road	N
35149749	Road	N
35149756	Road	N
35149780	Road	N
35149798	Road	Y
35149806	Road	N
35149970	Road	N
35149988	Road	Y
35149996	Road	Y
35150002	Road	Y
35150010	Road	Y
35150028	Road	Y
35150135	Road	Y
35150143	Road	Y
35150150	Road	Y
35150168	Road	Y
35150176	Road	Y
35150879	Water	N
35150887	Water	N
35150895	Water	N
35150911	Water	N
35150929	Water	N
35150978	Water	N
35150986	Water	N
35150994	Water	N
35151000	Water	N
35151018	Water	N
35151026	Water	N
35151034	Water	N
35151042	Water	N
35151059	Water	N
35151067	Water	N
35151075	Water	N
35151083	Water	N
35151091	Water	N
35151109	Water	N
35151117	Water	N
35151125	Water	N
35151133	Water	N
35151141	Water	N
35151158	Water	N
35151166	Water	N
35151174	Water	N

PID	Ownership	Within Project Footprint
35151182	Water	N
35151190	Water	N
35151208	Water	N
35151216	Water	N
35151224	Water	N
35151315	Water	N
35151323	Water	N
35151331	Water	N
35151349	Water	N
35151356	Water	Y
35151364	Water	N
35151372	Water	N
35151380	Water	N
35151398	Water	N
35151406	Water	N
35151414	Water	N
35151422	Water	N
35151430	Water	N
35151448	Water	N
35151455	Water	N
35151463	Water	Y
35151471	Water	N
35151489	Water	N
35151497	Water	N
35151505	Water	N
35151513	Water	N
35151521	Water	N
35151539	Water	N
35151547	Water	N
35151554	Water	N
35151562	Water	N
35151570	Water	N
35151588	Water	N
35151596	Water	N
35151604	Water	N
35151612	Water	N
35151620	Water	N
35151638	Water	N
35151646	Water	Y
35151653	Water	N
35151661	Water	N
35151679	Water	N
35151687	Water	Y
35151703	Water	N
35151711	Water	N
35151729	Water	N
35151737	Water	N
35151745	Water	N
35151760	Water	N
35151778	Water	N
35151786	Water	N
35151794	Water	N

PID	Ownership	Within Project Footprint
35151802	Water	N
35151810	Water	N
35151828	Water	N
35151836	Water	N
35151844	Water	N
35151851	Water	N
35151869	Water	N
35151901	Water	N
35151919	Water	N
35151927	Water	N
35151935	Water	N
35151943	Water	N
35151976	Water	N
35152032	Water	N
35152040	Water	N
35152057	Water	N
35152065	Water	N
35152073	Water	N
35152099	Water	N
35152107	Water	N
35152115	Water	N
35152123	Water	N
35152131	Water	N
35152149	Water	N
35152156	Water	N
35152164	Water	N
35153238	Water	N
35153246	Water	N
35153352	Water	N
35153360	Water	N
35153378	Water	N
35153386	Water	N
35153402	Water	N
35153428	Water	N
35153436	Water	N
35153444	Water	N
35153451	Water	N
35153568	Water	N
35154418	Water	N
35154426	Water	N
35154434	Water	N
35154442	Water	N
35154459	Water	N
35154467	Water	N
35154475	Water	N
35154483	Water	N
35154491	Water	N
35154517	Water	N
35154525	Water	Y
35154541	Water	N
35154558	Water	N

PID	Ownership	Within Project Footprint
35154566	Water	N
35154574	Water	Y
35154582	Water	N
35154590	Water	N
35154608	Water	N
35154616	Water	N
35154624	Water	N
35154632	Water	N
35154640	Water	N
35154657	Water	N
35154665	Water	N
35154673	Water	N
35154681	Water	N
35154699	Water	N
35154707	Water	N
35154715	Water	N
35154723	Water	N
35154731	Water	N
35154749	Water	Y
35154764	Water	N
35154772	Water	N
35154780	Water	N
35154798	Water	N
35154806	Water	N
35154848	Water	N
35154855	Water	N
35154871	Water	N
35154889	Water	N
35154996	Water	N
35155209	Water	N
35155365	Water	N
35155373	Water	N
35155381	Water	N
35156140	Road	Y
35156157	Road	Y
35156173	Road	N
35156181	Road	Y
35158120	Water	N
35158120	Water	N
35178037	Private	N
35179340	Private	Y
35179357	Private	Y
35181742	Private	Y
35181759	Private	Y
35181767	Private	Y
35199470	Private	Y
35199975	Private	N
35200005	Private	N
35200005	Private	N
35205731	Private	Y
35210939	Private	Y

PID	Ownership	Within Project Footprint
35211135	Private	Y
35218510	Private	N
35236652	Private	Y

APPENDIX B

ENGAGEMENT

Life on the hill at

Inside the secret wartime outpost, young airmen forged friendships, for

Editor's note: This is the second of a two-part series on No. 5 Radar Unit, a Second World War installation located on the Barrens above Cole Harbour, between Port Felix and Charles Cove in Guysborough County, and the hidden role it played in defending Canada's Atlantic coast.

Katie Edwards

GUYSBOROUGH COUNTY

— It is clear that Mickey Stevens was a man who had a memory like a steel trap and who maintained close relationships with his fellow veterans all his life. He died in 2014, almost 98 years old, and as I read his work — letters and vignettes and captioned pictures of No. 5 R.U. — I felt sad that I had not known this great Canadian.

So I did the next best thing: I found his son, Mark, on Facebook. This led to a lovely phone call about Mickey Stevens, a man who was an exemplary friend and an extraordinary keeper of secrets.

Mark Stevens recalls his father petitioning the Canadian government for his service record, perhaps in the 1990s. When it arrived, it was enormously thick — and almost entirely redacted.



Buildings at No. 5 Radar Unit in Cole Harbour show the station's core layout, including the canteen and mess, officers' quarters and orderly room, with a volleyball court built by airmen visible near the centre. (Photos are from the personal collection of Mickey Stevens and run courtesy of his son, Mark Stevens). Contributed

But we do know a bit about the actual work that went on at the radar station in Guysborough: the airmen worked in six-hour daily shifts, and for two 45-minute periods in those shifts, they manned a communications headset. The radar unit had

two chief responsibilities: giving an hourly weather report to the Eastern Air Command (E.A.C.) in Dartmouth (entirely in code, to provide pilots with data for flying) and listening for any aircraft or surfaced U-boats in their range.

The filter centre at the E.A.C., staffed largely by members of the Women's Division (W.D.), plotted information from the radar units and fed the intelligence to sector control rooms at the fighter airdrome. The airmen in Guysborough could often pick up RCAF fighter planes leaving Halifax in response to their detection of suspicious aircraft.

It was an odd sort of war effort: almost totally remote. The airmen could only calibrate success through the presence of nothingness. It was a good day if nothing happened, if no Allied

vessels were destroyed by the Germans. But this was all invisible to them, as they were dozens of miles away, perched on a hill high above the Atlantic. Listening.

In the long hours of the night, when air traffic was light, the men sometimes tried to engage the W.D. in conversation. They also tried to convince the women that the radar station was terribly isolated, hoping to incite pity.

In 1944, after two years of such chatter, eleven Filter Room W.D.s from the E.A.C. arrived unannounced at the Monastery Railway Station, 65 miles from Cole Harbour. Although no one ever confessed to inviting them, the women arrived expecting to be transported to the radar station. One of the airmen at the station

Continued on 17

Open Houses

Join us at an Open House for Wind Farm 2 as part of the Guysborough Wind Projects

EverWind invites you to join us at one of our upcoming open house information sessions to learn more about Wind Farm 2 as part of the Guysborough Wind Projects. Wind Farm 2 involves up to 158 proposed wind turbines producing up to 1,266 MW of renewable electricity, located in Guysborough County near the communities of Lundy, Larry's River, Tor Bay, New Harbour, Goldboro, and Roachvale.

These informal drop-in sessions, featuring poster boards, are an opportunity to meet the team, review early project information, ask questions, and share your feedback in an open and collaborative setting. Community input is an important part of the planning process, and we welcome your participation.

Open House Sessions

Tuesday, April 7, 2026 1:00 – 4:00 p.m.	Communities Along the Bay 6202 Highway 316, Larry's River
Tuesday, April 7, 2026 6:00 – 8:00 p.m.	Harbourview Community Centre 9503 Highway 316, New Harbour
Wednesday, April 8, 2026 1:00 – 4:00 p.m.	Goldboro Interpretive Centre 12881 Highway 316, Goldboro
Wednesday, April 8, 2026 6:00 – 8:00 p.m.	Erinville Firehall 3911 South River Lake Rd, Salmon River

Do you have questions?

We'd love to hear from you. Email us at info@guysboroughwind.com or visit guysboroughwind.com for more information.

You can also visit us during our office hours on Tuesdays & Wednesdays from 10 a.m. – 4 p.m. located in the Mall (9996 Highway 16, Guysborough).



THE TOWN OF
ANTIGONISH

MUNICIPALITY OF THE COUNTY OF
ANTIGONISH

Recreation Needs Assessment Public Engagement Sessions

Date	Location	Address
Tuesday, March 24 6-8 PM	St. Andrew Junior School (SAJS)	2 Appleseed Drive
Wednesday, March 25 2-4 PM	Virtual Session	Register to receive virtual link
Wednesday, March 25 6-8 PM	Arisaig Community Centre	5548 Highway 245, Arisaig
Thursday, March 26 2-4 PM	St. Joseph's Community Centre	2752 Ohio East Road, St. Joseph's
Thursday, March 26 6-8 PM	Virtual Session	Register to receive virtual link
Tuesday, March 31 6-8 PM	Heatherton Community Centre	42 Summerside Road, Heatherton
Wednesday, April 1 2-4 PM	Antigonish Legion	75 St. Ninians Street
Wednesday, April 1 6-8 PM	Mini-Trail Community Centre	4382 Highway 337, Lakevale

Scan the QR Code for more info or to pre-register for an engagement session!

You're Invited!

Come share your thoughts and ideas about recreation in Antigonish.

New pumper truck for Sherbrooke Volunteer Fire Department

Joanne Jordan

Local Journalism
Initiative Reporter

SHERBROOKE – After years of fundraising, the

Sherbrooke Volunteer Fire Department (SVFD) took possession of its new pumper truck, delivered to their fire station via flatbed by TDR Transport

of Bedford on March 26.

"It's a good day for Sherbrooke, and a good day for the fire department," said volunteer firefighter and Municipality of



Members of the Sherbrooke and Area Volunteer Fire Department: Ed Weir (back, left), Wendy Shelly, Dana O'Connell, Kevin Rudolph, Brian Hallett, Glenda Mills, Farley Carroll, Laura Banks, Wayne Auton, fire chief Kenneth Pye, Chrissy Rudolph, Darrell Beaver, Mark Bridger, Chris Fraser (front, left), Rodney MacDougall and Andrew Kaiser display their new pumper truck. Joanne Jordan

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the District of St. Mary's municipal councillor Dana O'Connell, who met with *The Journal* for a chat and a photo of the new truck along with Fire Chief Kenneth Pye and fellow SVFD members.

Following a wide-spread search, the truck was discovered for sale online, and the Sherbrooke department was quick to snap it up. Purchased from the Lackawaxen Township Volunteer Fire Department in Pennsylvania for \$210,000, plus transport fees, the 2013 Freightliner pumper will replace the SVFD's 1987 Ford pumper.

"This pumper will serve all communities in our district," Pye said. And we do mutual aid for Ecum Secum, Liscombe, Port Bickerton,

Goshen, St. Mary's – all the departments that are around us. It works both ways – if we need them they come to us, and if they need us we go to them. We got the insurance on it, and we have a couple of other little things to do and it should be ready to go."

Pye noted the new pumper – which is good for another 10 years – gives the department a bit more reliability. "We feel more confident. We know we have something that's going to work."

Fellow volunteer firefighter Kevin Rudolph agreed. "We hope to serve the public well," he said.

Added long-time volunteer Farley Carroll: "A new pumper would have cost at least \$750,000."

Monies for the truck were raised by the SVFD over a number of years through a combination of donations from commu-

nity members and groups, fundraisers including raffles for firewood and Christmas baskets, and the weekly online Nova Scotia Firefighters 50-50 draw.

Former member of the SVFD Neil Black expressed thanks "to the men and women of the department who volunteer their time and energy to serve Sherbrooke and surrounding communities," commending them for their hard work serving and protecting the communities and for the years spent raising the funds needed to purchase the new pumper truck.

"Those people are a real community in themselves," said Black. "They are the guys and girls who dedicate their time and never hesitate to answer our call – our first responders truly are our angels, and I am so proud of them."

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Welcome Pjila'si

Community Open House 2026

*Visual simulation of the proposed Wind Farm 2 Wind Project as part of the Guysborough Wind Projects

Land Acknowledgement

This project is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq people, who have been the caretakers of this land since time immemorial and continue to be today.

The Guysborough Wind Projects are being developed in partnership with Mi'kmaq communities, with a shared commitment to Indigenous leadership, respect for rights and knowledge, and meaningful, long-term collaboration.

We also recognize African Nova Scotians as a distinct people whose histories, cultures, and contributions have shaped Nova Scotia for more than 400 years and continue to enrich communities across the province.

About the Membertou Led Indigenous Consortium



- Membertou Development Corporation is **leading a Mi'kmaq Nations consortium with equity ownership** in both Phase 1 and 2 wind projects.
- The projects follow an **Indigenous equity partner ownership model**, supporting **meaningful shared leadership and decision-making**.
- The partnership enables long-term **participation in both the development, construction and operation** of the projects.
- The consortium structure reflects a commitment to **economic reconciliation, local capacity building, and intergenerational benefits** for participating Mi'kmaq communities.



About EverWind

- EverWind is a **Canadian company** developing industrial energy and infrastructure projects across Atlantic Canada.
- Building on **existing marine and energy infrastructure** to deliver clean fuel solutions.
- Supplying **domestic and international markets** with large-scale, low-carbon energy.
- **Team of 100+ employees**, primarily from local communities, supported by technical partners.
- **Experienced developers, owners, and operators** of complex infrastructure projects across North America.
- Committed to **responsible development** grounded in environmental stewardship, Indigenous partnership, community engagement, and **long-term economic benefit**.



Point Tupper Energy Infrastructure Hub



 EVERWIND



ATLANTIC OCEAN



Phase 1 Wind Projects

Phase 2 Wind Projects

Point Tupper

About the Wind Farm 2 Wind Project

The Wind Farm 2 wind project development was started by EverWind in 2023 as part of its Phase 2 wind portfolio. The proposed project is a result of over two years of community engagement, field studies, wind measurement, and engineering.

Project Capacity	Up to 1.26 GW
Ownership	Membertou-led Indigenous Consortium & EverWind
# Turbines	Up to 158 turbines
Turbine Model	Goldwind GWH182-8.0
Hub Height	130 m
Total Height	~221 m
Interconnection	Consortium-owned HV transmission line
Project Location	Guysborough County near the communities of Lundy, Larry's River, Tor Bay, New Harbour, Goldboro & Roachvale.

Where We Are & Where We're Going



How a Wind Project is Sited

Choosing where to place wind turbines is a careful, multi-step process. No single factor decides where turbines go. It's about balancing technical, environmental, and community considerations.

When siting a wind project, the project team looks at:

- **Wind resource:** Areas with strong, consistent wind that can reliably generate electricity.
- **Land and terrain:** Land suitability, slope, soil conditions, and safe access for construction and maintenance.
- **Environmental studies:** Detailed studies to understand potential effects on wildlife, wetlands, watercourses, forests, and habitats, and how impacts can be avoided or reduced.
- **Setbacks and regulations:** Provincial and municipal requirements, including minimum distances from homes, roads, water bodies, and other features.
- **Cultural and archaeological considerations:** Studies and engagement to identify and protect areas of cultural, archaeological, or historical importance.
- **Community input:** Local knowledge, feedback, and concerns shared through open houses, engagement sessions, and future Community Liaison Committee discussions.

Siting decisions are refined over time as studies are completed, and community feedback is considered. The goal is to place turbines in locations that are safe, responsible, and respectful of the environment and nearby communities.

Environmental Assessment

Purpose

- An Environmental Assessment (EA) helps proponents plan projects to minimize environment impacts.

EA Registration Documents Include

- Information on the Project (location, phases of development, construction, schedule etc.).
- Indigenous and public engagement.
- Methods and results of baseline studies (desktop, field, predictive modelling etc.).
- Proposed mitigations.
- Significance of adverse effects on Valued Environmental Components (VECs).

Registration

- Public are notified of registration and have 40 days to submit comments.
- The EA is reviewed by a wide variety of provincial and federal departments.
- Regulators evaluate the design and plan of the Project through the EA process, to ensure environmental impacts are identified and managed before a project is constructed.
- Decision made by the Minister of Nova Scotia Environment and Climate Change.

Environmental Studies

- ✓ **Thousands of hours of studies**, completed by scientists, biologists, engineers and other technical experts.
- ✓ Informed by years of local community, regulatory and Indigenous engagement activities and feedback.
- ✓ Cumulative impacts are being considered.



Birds & Bats

- Breeding and migratory surveys, radar & acoustic monitoring, habitat surveys
- Targeted surveys for nightjars



Aquatic Environment

- Fish & fish habitat
- Wetland delineation and functional assessments



Terrestrial Wildlife

- Year-round surveys for terrestrial wildlife
- Targeted mainland moose and wood turtle surveys



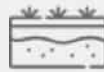
Terrestrial Habitat

- Rare plant surveys
- Lichen surveys
- Old growth forest surveys
- Habitat assessments



Atmospheric Environment

- Greenhouse gas (GHG) assessment
- Noise modelling
- Shadow flicker modelling



Geophysical Environment

- Surficial and bedrock geology
- Groundwater



Heritage & Cultural

- Mi'kmaq Ecological Knowledge Study (MEKS)
- Archaeological Resource Impact Assessment (ARIA)

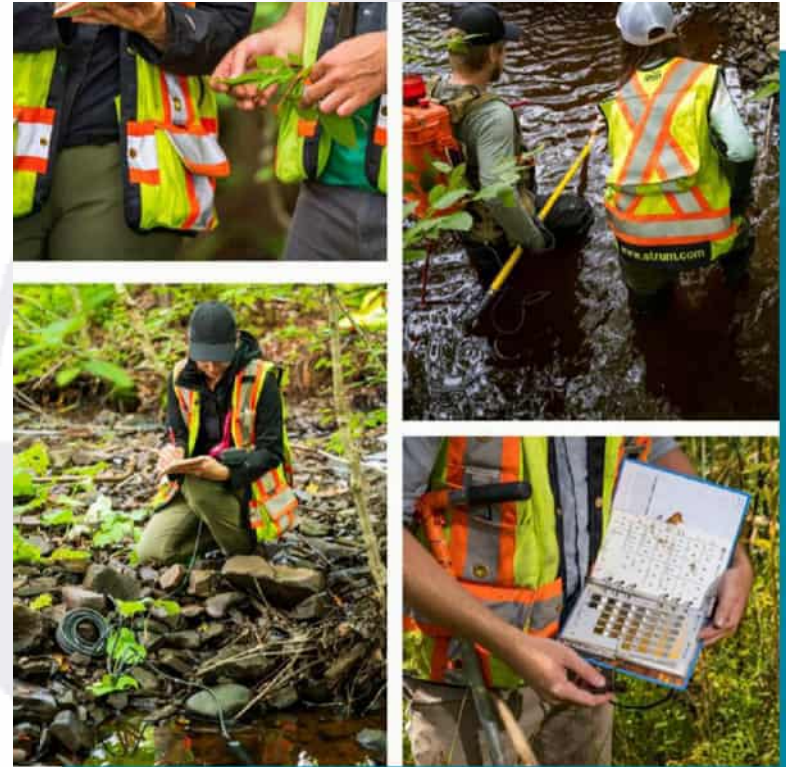


Social & Economic

- Desktop assessments for: local & provincial economy, land use & value, and recreation & tourism

Environmental Monitoring

- Prior to certain project phases, the following plans will be developed, implemented, and submitted to Nova Scotia Environment and Climate Change:
 - Surface Water Management Plan
 - Erosion and Sediment Control Plan
 - Blasting Management Plan (if blasting is required)
 - Terrestrial Habitat and Wildlife Management Plan
 - Avian and Bat Monitoring Plan
 - Adaptive Management Plan
 - Complaints Resolution Plan
 - Mi'kmaq Communication Plan
 - Contingency Plan
- A second year of radar and acoustic monitoring for birds and bats will be completed prior to operations.
- Two years of monitoring for birds and bats will be completed during operations.
- Two years of monitoring for mainland moose is typically required during operations.
- A Traffic Management Plan will be developed.



Local Benefits: Direct, Indirect & Induced

- We believe our projects are net positives for the local communities in which we work.
- Benefits include:
 - **Billion-dollar Investment** in the Municipality of the District of Guysborough.
 - Contracting opportunities for **Indigenous & local businesses**.
 - **Community Benefits Funds** paid out annually directly to the community through a combination of Proximity Payments, Vibrancy Fund and Bursaries.
 - Increased **local spending** on goods and services during the project's development, construction and operational phases.
 - Millions in project lifetime paid to the municipality.

Annual Municipal Tax

~\$11 million per year*

Project Life Municipal Tax

~\$455 million*

Wind development creates lasting economic spin-offs, supports local services, and delivers **stable, long-term revenue** to local municipalities.

Significant Job Creation



400-500 of Direct Jobs During Construction:

- ✓ **Civil installation:** land clearing, road construction, forming, concrete supply, grouting
- ✓ **Electrical installation:** overground installation, electrical testing, instrument installation
- ✓ **Turbine installation:** crane supply, turbine offload, mechanical and electrical work
- ✓ **Local businesses:** benefits from increased local spending with larger local workforce

~40-50 Part-Time and Full-Time Jobs during Operations and Maintenance:

- ✓ HV Technicians / Electricians
- ✓ Wind Technicians
- ✓ Road Maintenance Workers
- ✓ Vegetation Management Service Providers
- ✓ Snow & Surface Removal
- ✓ Administrative Support
- ✓ Inventory / Materials Management

Pre-Construction activities to start in 2029. A job fair will be held prior to start of construction. On-the-job training will be available.

Community Liaison Committee (CLC)

EverWind is committed to open communication and long-term collaboration with the communities where the project is being developed. As part of that commitment, a Community Liaison Committee (CLC) will be established for the project.

The CLC is a volunteer group made up of people from across the region, including local residents, landowners, municipal representatives, and members of community organizations. Members are selected through a public call for interest.

The CLC provides a way for community members and the project team to connect regularly and share information. Its role includes:

- Supporting ongoing communication throughout project development, construction, and operations.
- Providing a space to share local questions, concerns, and ideas.
- Offering input on potential project impacts and how they can be managed.
- Helping inform community benefit programs and local priorities.

If you are interested in learning more or getting involved in the CLC, please email [**info@guysboroughwind.com**](mailto:info@guysboroughwind.com)

Community Benefits Agreement

The Community Benefits Agreement includes a range of initiatives designed to deliver direct, long-term value to local communities, including the following:

Community Vibrancy Fund



Annual community benefits fund earmarked for community organisations

Proximity Payment



Direct payments to homeowners within a specified distance

Bursary Fund



Funds for education and training in the renewables industry, including supporting placements in the Wind Turbine Tech Program at NSCC

Other Benefits

- ✓ Local job fairs
- ✓ Contracting for Indigenous and local businesses
- ✓ Increased local spending

EverWind commits to \$1,000 per MW to Community Benefit Funds: >\$1 million annually*

Decommissioning

Repowering:

- Global trends favour **repowering** due to renewable wind resources
- Technological advances enable **efficient turbine replacements**

Decommissioning

- **All steel** is recyclable
- **>90%** of wind turbine is recyclable today!
- **Emerging technology** for turbine blade recycling
- **Dismantling** and **removal** of the turbines and all other equipment
- Removal of the turbine **foundations** down to 1m below grade
- **Reclamation** of the land



EverWind will provide a decommissioning plan to ensure funds are available to remove project facilities at end of project life

Help Us Choose a New Name for Wind Farm 2!

We're looking for a name that reflects the place, the people, and what matters most to the community. This project will grow alongside the community and bring renewable energy, local jobs, and long-term benefits. Below are a few name ideas shared by local students and community members. **Please place a sticker on or near the name you like best.**

Baie du Vent Wind Project

(Bay of Wind)
Highlights Acadian
culture & history of the
area. Suggested by a
local student

Harbour Wind Project

Reflects the project's
proximity to key Eastern
Shore harbours

Ocean Lake Wind Project

Connects the project
to this important part of
the local landscape

Weji Sipu Wind Project

"Weh-jee See-boo"
(Wind Flow) Honours
the Mi'kmaq language
& its connection to the
natural world

Thank you / Wela'lioq

We appreciate you taking the time to join us!

Please fill out a feedback form

Visit our website to stay up-to-date on the project
guysboroughwind.com

Have a follow up question? Email us at **info@guysboroughwind.com**

You can also visit us during our office hours on Tuesdays & Wednesdays from
10 a.m. - 4 p.m. located in the Mall (9996 Highway 16, Guysborough)

APPENDIX C

WSP EMI STUDY



EverWind Ltd.

Ocean Lake Wind Project

Electromagnetic Interference

2026-04-28

CA0066766.3659





Document distribution

EverWind Ltd.

Ocean Lake Wind Project

Electromagnetic Interference

2026-04-28

CA0066766.3659

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Appendix A – Main Correspondence

1. Electromagnetic Interference - EMI

Guysborough Wind Ltd., comprised of EverWind NS Holdings Ltd. (EverWind) and Membertou Development Corporation, is proposing development of the Ocean Lake Project (the Project) in Guysborough County, Nova Scotia. EverWind retained WSP Canada Inc. (WSP) to prepare an assessment of potential electromagnetic interference from the Project on existing radiocommunication and radar systems.

Under certain conditions, wind turbines can adversely affect radio communication and radar systems. Engaging key stakeholders early in the planning process is strongly advised to confirm that a proposed installation will not result in unacceptable interference, thereby avoiding costly design modifications or project delays during later stages of development (RABC & CanWEA, 2025).

The degree and nature of interference depend on the physical and operational properties of the turbine. Key influencing factors include rotor blade dimensions and aerodynamic design, hub and tower height, tower diameter, and the material composition of both blades and tower structures.

Electromagnetic interference (EMI) generated by a wind turbine is generally categorized into obstruction and reflection. Obstruction occurs when a turbine is positioned along the line-of-sight between a transmitter and a receiver, leading to signal attenuation or complete signal blockage. Reflection arises when the original signal is distorted by reflected energy from turbine surfaces. A subset of reflection interference, known as scatter, is specifically associated with the movement of the rotor blades, which creates rapidly varying reflections (RABC & CanWEA, 2025).

1.1 Assessment Methodology

Early engagement with relevant stakeholders is advised to confirm that a proposed installation will not result in unacceptable interference.

The EMI assessment was conducted following the guidance in *Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems* (RABC & CanWEA, 2025).

Using the Industry Canada Spectrum Direct (ISED) online tool, Industry Canada's publicly accessible database of radio installations was consulted to identify locations of existing radiocommunication and radar systems within consultation zones, as shown in Table 1.1.

Some system and licensing information is not made available to the public. In these situations, ISED performs a search of the licensing data to identify users in the area who may also require consultation, and if potential interference is identified, ISED helps to establish a connection between the Project proponent and the license holder.

Table 1.1 Consultation zones, according to RABC & CanWEA guidelines (2025)

Systems	Consultation Zone
Point-to-Point Systems above 890 megahertz (MHz)	1 km
Broadcast Transmitters (AM, FM, and TV stations)	AM Station: omnidirectional (single tower) antenna system: 5 km directional (multiple towers) antenna system: 15 km FM station: 2 km TV station: 2 km
Over-the-Air Reception (TV off-air pickup, consumer TV receivers)	Analog TV Station (NTSC): 15 km Digital TV (DTV) station (ATSC): 10 km
Cellular Type Networks, Land Mobile Radio Networks, and Point-to-Point Systems below 890 MHz	1 km
Satellite Systems (Direct to Home, Satellite Ground Stations)	500 m
Air Defence Radars, Vessel Traffic Radars, Air Traffic Control Radars, and Weather Radars	Department of National Defence (DND) Air Defence Radar: 100 km DND or NAV Canada Air Traffic Control Primary Surveillance Radar: 80 km DND or NAV Can Air Traffic Control Secondary Surveillance Radar: 10 km DND Precision Approach Radar: 40 km Canadian Coast Guard Vessel Traffic Radar System: 60 km Military or Civilian airfield: 10 km Environment Canada Weather Radar: 60 km
Very High Frequency OmniRange	15 km

Consultation letters were sent to all mandatory contacts listed in the RABC & CanWEA guidance and to the licence holders identified through the ISED open database search, presenting the Ocean Lake Wind Project (then called Wind Farm 2 Wind Project), including a reference map and a KMZ file, that can be used in GIS environment. The proposed turbine specifications presented were:

- Number of turbines: 158
- Turbine model: Goldwind 182-8.0 MW
 - Tip height: 221.7 m
 - Hub height: 130 m
 - Rotor configuration: 3 blades
 - Rotor/Blade sweep diameter: 183.4 m (blade length: 91.7 m)

1.2 Engagement Summary

Table 1.2 presents the summary of the engagement done. As of April 07, 2026, most responses received indicated no potential interference with radio communication and radar systems.

The Guysborough Memorial Hospital was contacted, since some project structures are located within 8 to 10 km from the facility's heliport. Information was provided to the provincial helipad committee and EHS Life Flight.

ISED search on non-public database indicated potential interference with existing and planned infrastructure from the Public Safety Field Communications of Nova Scotia. Contact was established with the service manager, and both parties are working together to discuss concerns and potential mitigation measures.

It is important to note that response time can vary significantly between stakeholders and that changes to some project features (e.g. layout, turbine dimensions) could require a new assessment by the licence holders. For these reasons, EverWind remains committed to maintaining ongoing communication with stakeholders and to actively addressing concerns raised by them and by the public throughout the life of the Project.

Table 1.2 Summary of EMI engagement

Government Departments, Agencies & Regulators	Main communications and dates	Conclusion
Industry Canada Spectrum Direct (ISED)	2026-02-27: Notification letter 2026-03-02: Acknowledgement of receipt 2026-03-04: Search results identified a non-disclosed system that will require additional consultation	Requirement of further communication with the Nova Scotia Public Safety Field Communications, Department of Emergency Management
Department of National Defence (DND)	2026-02-27: Notification letter 2026-03-12: Acknowledgement of receipt. Requested up to 8 weeks for final assessment	No final response to date. Late responses will be forwarded to EverWind
Royal Canadian Mounted Police	2026-02-27: Notification letter 2026-03-02: Acknowledgement of receipt 2026-03-06: Final response	No interference issue anticipated. Requirement to validate with Bell
Canadian Coast Guard	2026-02-27: Notification letter 2026-03-02: Final response	No interference issue anticipated
Environment Canada	2026-02-27: Notification letter 2026-03-11: Final response	No interference issue anticipated. If additional turbines are proposed in the vicinity, new assessments may be needed
NAV CANADA	2026-03-09: Online submission 2026-03-09: Acknowledgement of receipt, indicating 8 to 12 weeks for response.	No final response to date. Late responses will be forwarded to EverWind

Government Departments, Agencies & Regulators	Main communications and dates	Conclusion
Nova Scotia Public Safety Field Communications, Department of Emergency Management	2026-03-09: First contact from Mobile Radio Service Manager 2026-03-11: Notification letter 2026-03-17: Analysis result indicating potential interference with existing and proposed infrastructure.	Meeting between EverWind and Public Safety Field Communications scheduled to address concerns.
Guysborough Memorial Hospital	2026-03-12: First contact with Facilities Manager and Assistant Zone Manager, Maintenance & Operations. 2026-03-16: Information was forwarded by Assistant Zone Manager to the provincial helipad committee and EHS Life Flight 2026-04-01: Follow up e-mail sent to Assistant Zone Manager 2026-04-01: Response indicating information was forwarded along and no concerns were relayed back.	No interference issue anticipated
Fire Service Association of Guysborough	2026-04-01: Notification letter	No final response to date. Late responses will be forwarded to EverWind
Bell Canada	2026-02-27: Notification letter 2026-03-27: Follow-up communication, requesting acknowledgement 2026-03-30: Final response	No interference issue anticipated
Rogers	2026-04-01: Notification letter	No final response to date. Late responses will be forwarded to EverWind

Government Departments, Agencies & Regulators	Main communications and dates	Conclusion
Eastlink	2026-04-01: Notification letter 2026-04-02: Response indicating engineering team will reach out if concerns arise.	No final response to date. Late responses will be forwarded to EverWind
Seaside Communications	2026-04-01: Notification letter 2026-04-07: Follow-up message to the Network Operations Centre	No final response to date. Late responses will be forwarded to EverWind

Bibliography

Journal articles

RABC & CanWEA. (2025). Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems: RABC–CanWEA Guidelines (Updated 2025). RABC-CANWEA-Guidelines-_Updated-2025.

Appendix A – Main Correspondence

This appendix presents the notification letter sent to the stakeholders and relevant communication, including final responses received, as of April 07, 2026.



WSP
50 Troop Ave
Dartmouth, Nova Scotia B3B 1Z1
Canada
wsp.com

2026-02-27
Reference: CA0066766.3659

Innovation, Science and Economic Development Canada
(ISED)
Email: ic.spectrumnsd-spectredne.ic@canada.ca;
sarah.ivany@ised-isde.gc.ca

Wind Farm 2 Wind Project

Subject: Wind Farm 2 Wind Project – Guysborough County, Nova Scotia

Dear ISED representative,

WSP Canada has been engaged by EverWind to support the proposed Wind Farm 2 Wind Project (the “Project”) in Guysborough County, Nova Scotia.

On behalf of our client, WSP is conducting an electromagnetic interference (EMI) assessment related to the placement of 158 wind turbines. As part of this process, we are seeking feedback, operational details, and technical specifications from stakeholders to determine whether the proposed turbine installations could potentially interfere with your existing operations.

The proposed turbine specifications are as follows:

- Number of turbines: 158
- Turbine model: Goldwind 182-8.0 MW
 - Tip height: 221.7 m
 - Hub height: 130 m
 - Rotor configuration: 3 blades
 - Rotor/Blade sweep diameter: 183.4 m (blade length: 91.7 m)

For your reference, a map showing the proposed turbine locations is attached (**Figure 1**). Additionally, a summary of the turbines’ details, including coordinates and elevations, is provided in Table 1, presented below.

Table 1. Proposed Turbine Locations & Specifications

Turbine ID	Coordinates		Base Elevation (m)	Turbine Hub Height (m)	Tip Height (m)	Total Elevation (m)
	Lat	Long				
T1	45° 20' 9.13" N	061° 33' 0.52" W	189.4	130	221.7	411.1
T10	45° 19' 26.58" N	061° 33' 56.95" W	142.0	130	221.7	363.7
T100	45° 13' 46.44" N	061° 37' 1.39" W	97.3	130	221.7	319.0
T101	45° 13' 37.92" N	061° 25' 2.85" W	87.0	130	221.7	308.7
T102	45° 13' 35.74" N	061° 27' 23.06" W	110.0	130	221.7	331.7
T103	45° 13' 34.77" N	061° 29' 9.96" W	103.7	130	221.7	325.4
T104	45° 13' 32.91" N	061° 25' 47.79" W	91.8	130	221.7	313.5
T105	45° 13' 30.83" N	061° 26' 28.3" W	93.9	130	221.7	315.6
T106	45° 13' 30.04" N	061° 34' 6.36" W	66.2	130	221.7	287.9
T107	45° 13' 29.4" N	061° 36' 28.72" W	83.3	130	221.7	305.0
T108	45° 13' 29.1" N	061° 27' 54.38" W	108.4	130	221.7	330.1
T109	45° 13' 27.02" N	061° 24' 16.91" W	78.6	130	221.7	300.3
T11	45° 19' 24.0" N	061° 34' 55.12" W	162.1	130	221.7	383.8
T110	45° 13' 21.91" N	061° 35' 54.24" W	55.4	130	221.7	277.1
T111	45° 13' 19.44" N	061° 28' 35.26" W	122.6	130	221.7	344.3
T112	45° 13' 13.69" N	061° 27' 58.39" W	103.9	130	221.7	325.6
T113	45° 13' 12.96" N	061° 27' 11.02" W	111.5	130	221.7	333.2
T114	45° 13' 11.33" N	061° 24' 35.23" W	80.0	130	221.7	301.7
T115	45° 13' 10.07" N	061° 25' 10.28" W	93.3	130	221.7	315.0
T116	45° 13' 5.36" N	061° 26' 17.49" W	60.2	130	221.7	281.9
T117	45° 12' 52.4" N	061° 27' 20.8" W	87.3	130	221.7	309.0
T118	45° 12' 48.76" N	061° 36' 9.95" W	71.8	130	221.7	293.5
T119	45° 12' 48.37" N	061° 24' 48.51" W	64.5	130	221.7	286.2
T12	45° 19' 8.71" N	061° 32' 53.85" W	134.1	130	221.7	355.8
T120	45° 12' 47.73" N	061° 27' 55.62" W	110.0	130	221.7	331.7
T121	45° 12' 45.41" N	061° 35' 34.39" W	70.9	130	221.7	292.6
T122	45° 12' 38.9" N	061° 34' 7.9" W	54.7	130	221.7	276.4
T123	45° 12' 32.75" N	061° 26' 40.84" W	50.5	130	221.7	272.2
T124	45° 12' 32.5" N	061° 25' 39.7" W	42.3	130	221.7	264.0
T125	45° 12' 32.42" N	061° 34' 44.64" W	59.6	130	221.7	281.3
T126	45° 12' 28.6" N	061° 27' 25.77" W	94.5	130	221.7	316.2
T127	45° 12' 28.29" N	061° 25' 5.57" W	25.6	130	221.7	247.3
T128	45° 12' 24.92" N	061° 33' 3.2" W	62.8	130	221.7	284.5
T129	45° 12' 22.24" N	061° 32' 28.94" W	51.7	130	221.7	273.4
T13	45° 18' 54.12" N	061° 34' 5.89" W	148.1	130	221.7	369.8
T130	45° 12' 20.94" N	061° 33' 38.36" W	54.7	130	221.7	276.4
T131	45° 12' 18.93" N	061° 35' 59.5" W	85.2	130	221.7	306.9

Turbine ID	Coordinates		Base Elevation (m)	Turbine Hub Height (m)	Tip Height (m)	Total Elevation (m)
	Lat	Long				
T132	45° 12' 15.28" N	061° 35' 20.41" W	62.7	130	221.7	284.4
T133	45° 12' 6.96" N	061° 25' 25.13" W	43.6	130	221.7	265.3
T134	45° 11' 59.71" N	061° 26' 55.92" W	53.6	130	221.7	275.3
T135	45° 11' 58.72" N	061° 36' 20.31" W	65.7	130	221.7	287.4
T136	45° 11' 58.03" N	061° 25' 56.78" W	62.8	130	221.7	284.5
T137	45° 11' 53.5" N	061° 33' 24.25" W	41.8	130	221.7	263.5
T138	45° 11' 51.8" N	061° 32' 44.82" W	37.2	130	221.7	258.9
T139	45° 11' 36.86" N	061° 25' 30.48" W	38.0	130	221.7	259.7
T14	45° 18' 52.96" N	061° 34' 57.78" W	150.3	130	221.7	372.0
T140	45° 11' 32.59" N	061° 27' 1.48" W	52.2	130	221.7	273.9
T141	45° 11' 28.38" N	061° 26' 0.25" W	39.7	130	221.7	261.4
T142	45° 11' 24.46" N	061° 33' 10.89" W	50.3	130	221.7	272.0
T143	45° 11' 15.89" N	061° 31' 8.79" W	40.6	130	221.7	262.3
T144	45° 11' 11.57" N	061° 32' 40.12" W	28.0	130	221.7	249.7
T145	45° 11' 10.82" N	061° 34' 4.9" W	56.4	130	221.7	278.1
T146	45° 11' 10.08" N	061° 22' 49.85" W	15.8	130	221.7	237.5
T147	45° 11' 9.53" N	061° 23' 58.86" W	18.7	130	221.7	240.4
T148	45° 11' 8.05" N	061° 26' 1.38" W	41.4	130	221.7	263.1
T149	45° 11' 7.0" N	061° 22' 18.47" W	13.8	130	221.7	235.5
T15	45° 18' 50.28" N	061° 32' 20.92" W	137.2	130	221.7	358.9
T150	45° 10' 53.95" N	061° 30' 51.2" W	33.8	130	221.7	255.5
T151	45° 10' 53.91" N	061° 24' 49.82" W	33.1	130	221.7	254.8
T152	45° 10' 50.86" N	061° 31' 37.05" W	37.7	130	221.7	259.4
T153	45° 10' 45.56" N	061° 26' 0.8" W	42.4	130	221.7	264.1
T154	45° 10' 38.78" N	061° 24' 22.2" W	23.6	130	221.7	245.3
T155	45° 10' 37.17" N	061° 30' 9.9" W	37.5	130	221.7	259.2
T156	45° 10' 30.12" N	061° 25' 29.05" W	33.4	130	221.7	255.1
T157	45° 10' 29.63" N	061° 30' 40.61" W	31.5	130	221.7	253.2
T158	45° 10' 14.01" N	061° 30' 3.45" W	25.2	130	221.7	246.9
T16	45° 18' 28.19" N	061° 32' 48.21" W	151.3	130	221.7	373.0
T17	45° 18' 26.75" N	061° 35' 37.75" W	145.8	130	221.7	367.5
T18	45° 18' 24.93" N	061° 34' 55.5" W	151.0	130	221.7	372.7
T19	45° 18' 16.37" N	061° 32' 0.63" W	151.1	130	221.7	372.8
T2	45° 20' 8.94" N	061° 33' 47.83" W	207.8	130	221.7	429.5
T20	45° 18' 3.03" N	061° 35' 19.29" W	152.1	130	221.7	373.8
T21	45° 17' 49.09" N	061° 36' 44.94" W	158.6	130	221.7	380.3
T22	45° 17' 40.69" N	061° 34' 26.75" W	138.1	130	221.7	359.8
T23	45° 17' 24.33" N	061° 37' 3.6" W	182.3	130	221.7	404.0
T24	45° 17' 19.83" N	061° 32' 19.06" W	144.4	130	221.7	366.1

Turbine ID	Coordinates		Base Elevation (m)	Turbine Hub Height (m)	Tip Height (m)	Total Elevation (m)
	Lat	Long				
T25	45° 17' 14.42" N	061° 35' 3.89" W	136.5	130	221.7	358.2
T26	45° 17' 5.19" N	061° 37' 8.91" W	162.7	130	221.7	384.4
T27	45° 16' 47.55" N	061° 34' 48.72" W	145.0	130	221.7	366.7
T28	45° 16' 50.25" N	061° 36' 27.79" W	132.7	130	221.7	354.4
T29	45° 16' 25.27" N	061° 31' 11.33" W	175.5	130	221.7	397.2
T3	45° 20' 0.89" N	061° 32' 12.3" W	152.1	130	221.7	373.8
T30	45° 16' 25.07" N	061° 31' 52.69" W	177.4	130	221.7	399.1
T31	45° 16' 22.51" N	061° 34' 24.25" W	128.7	130	221.7	350.4
T32	45° 16' 12.4" N	061° 30' 42.68" W	155.1	130	221.7	376.8
T33	45° 16' 11.84" N	061° 33' 17.35" W	150.9	130	221.7	372.6
T34	45° 16' 8.7" N	061° 38' 7.67" W	112.5	130	221.7	334.2
T35	45° 16' 6.11" N	061° 33' 54.28" W	146.8	130	221.7	368.5
T36	45° 16' 0.84" N	061° 31' 42.79" W	182.6	130	221.7	404.3
T37	45° 16' 0.51" N	061° 29' 57.14" W	116.1	130	221.7	337.8
T38	45° 15' 58.39" N	061° 34' 34.57" W	129.1	130	221.7	350.8
T39	45° 15' 48.68" N	061° 33' 19.62" W	150.0	130	221.7	371.7
T4	45° 19' 59.56" N	061° 34' 15.17" W	128.6	130	221.7	350.3
T40	45° 15' 47.42" N	061° 37' 24.27" W	101.3	130	221.7	323.0
T41	45° 15' 46.81" N	061° 29' 16.23" W	89.2	130	221.7	310.9
T42	45° 15' 45.95" N	061° 30' 23.58" W	127.1	130	221.7	348.8
T43	45° 15' 44.29" N	061° 32' 45.59" W	159.6	130	221.7	381.3
T44	45° 15' 43.2" N	061° 33' 53.61" W	131.6	130	221.7	353.3
T45	45° 15' 38.07" N	061° 28' 35.81" W	103.7	130	221.7	325.4
T46	45° 15' 35.85" N	061° 32' 7.46" W	166.9	130	221.7	388.6
T47	45° 15' 34.35" N	061° 31' 29.54" W	118.6	130	221.7	340.3
T48	45° 15' 32.79" N	061° 38' 25.47" W	64.5	130	221.7	286.2
T49	45° 15' 31.93" N	061° 27' 50.14" W	126.6	130	221.7	348.3
T5	45° 19' 56.59" N	061° 31' 30.12" W	119.0	130	221.7	340.7
T50	45° 15' 30.98" N	061° 30' 50.14" W	129.9	130	221.7	351.6
T51	45° 15' 28.73" N	061° 36' 41.81" W	80.0	130	221.7	301.7
T52	45° 15' 28.51" N	061° 34' 34.68" W	129.3	130	221.7	351.0
T53	45° 15' 27.52" N	061° 32' 37.54" W	171.2	130	221.7	392.9
T54	45° 15' 25.03" N	061° 29' 57.47" W	119.8	130	221.7	341.5
T55	45° 15' 22.39" N	061° 37' 39.47" W	69.9	130	221.7	291.6
T56	45° 15' 20.16" N	061° 33' 10.44" W	153.2	130	221.7	374.9
T57	45° 15' 19.28" N	061° 33' 45.61" W	129.1	130	221.7	350.8
T58	45° 15' 17.91" N	061° 39' 2.59" W	63.1	130	221.7	284.8
T59	45° 15' 13.65" N	061° 31' 54.03" W	167.6	130	221.7	389.3
T6	45° 19' 41.56" N	061° 32' 56.02" W	161.6	130	221.7	383.3

Turbine ID	Coordinates		Base Elevation (m)	Turbine Hub Height (m)	Tip Height (m)	Total Elevation (m)
	Lat	Long				
T60	45° 15' 11.86" N	061° 28' 8.91" W	116.5	130	221.7	338.2
T61	45° 15' 3.86" N	061° 29' 58.59" W	94.3	130	221.7	316.0
T62	45° 15' 3.29" N	061° 27' 21.58" W	87.5	130	221.7	309.2
T63	45° 15' 2.16" N	061° 31' 6.85" W	113.1	130	221.7	334.8
T64	45° 15' 1.98" N	061° 28' 45.78" W	114.9	130	221.7	336.6
T65	45° 15' 1.83" N	061° 32' 38.2" W	146.1	130	221.7	367.8
T66	45° 14' 57.41" N	061° 33' 28.58" W	134.0	130	221.7	355.7
T67	45° 14' 57.29" N	061° 38' 5.45" W	72.9	130	221.7	294.6
T68	45° 14' 52.47" N	061° 29' 23.88" W	118.0	130	221.7	339.7
T69	45° 14' 52.52" N	061° 33' 57.19" W	98.5	130	221.7	320.2
T7	45° 19' 39.09" N	061° 34' 33.64" W	142.5	130	221.7	364.2
T70	45° 14' 51.77" N	061° 35' 42.06" W	50.1	130	221.7	271.8
T71	45° 14' 50.98" N	061° 31' 45.26" W	164.2	130	221.7	385.9
T72	45° 14' 49.21" N	061° 30' 38.5" W	135.4	130	221.7	357.1
T73	45° 14' 40.8" N	061° 39' 8.65" W	59.7	130	221.7	281.4
T74	45° 14' 40.56" N	061° 32' 44.26" W	109.2	130	221.7	330.9
T75	45° 14' 40.34" N	061° 35' 8.2" W	63.9	130	221.7	285.6
T76	45° 14' 40.09" N	061° 28' 30.13" W	140.1	130	221.7	361.8
T77	45° 14' 37.47" N	061° 38' 33.03" W	56.9	130	221.7	278.6
T78	45° 14' 36.13" N	061° 27' 7.22" W	88.4	130	221.7	310.1
T79	45° 14' 28.56" N	061° 27' 56.54" W	113.8	130	221.7	335.5
T8	45° 19' 37.3" N	061° 33' 30.01" W	157.9	130	221.7	379.6
T80	45° 14' 27.85" N	061° 28' 57.98" W	135.1	130	221.7	356.8
T81	45° 14' 27.8" N	061° 31' 30.26" W	109.1	130	221.7	330.8
T82	45° 14' 26.18" N	061° 37' 41.37" W	83.9	130	221.7	305.6
T83	45° 14' 26.13" N	061° 30' 58.06" W	97.8	130	221.7	319.5
T84	45° 14' 17.51" N	061° 28' 28.31" W	144.2	130	221.7	365.9
T85	45° 14' 15.26" N	061° 34' 51.71" W	73.5	130	221.7	295.2
T86	45° 14' 7.86" N	061° 38' 9.56" W	84.1	130	221.7	305.8
T87	45° 14' 7.68" N	061° 29' 11.3" W	121.9	130	221.7	343.6
T88	45° 14' 4.37" N	061° 29' 56.64" W	84.1	130	221.7	305.8
T89	45° 14' 3.19" N	061° 39' 6.82" W	81.6	130	221.7	303.3
T9	45° 19' 30.37" N	061° 32' 26.55" W	130.0	130	221.7	351.7
T90	45° 14' 2.68" N	061° 37' 23.33" W	90.8	130	221.7	312.5
T91	45° 14' 2.27" N	061° 27' 35.39" W	116.4	130	221.7	338.1
T92	45° 13' 56.95" N	061° 26' 57.48" W	90.5	130	221.7	312.2
T93	45° 13' 55.46" N	061° 26' 19.74" W	93.8	130	221.7	315.5
T94	45° 13' 55.12" N	061° 25' 43.16" W	109.2	130	221.7	330.9
T95	45° 13' 52.97" N	061° 24' 34.47" W	96.8	130	221.7	318.5



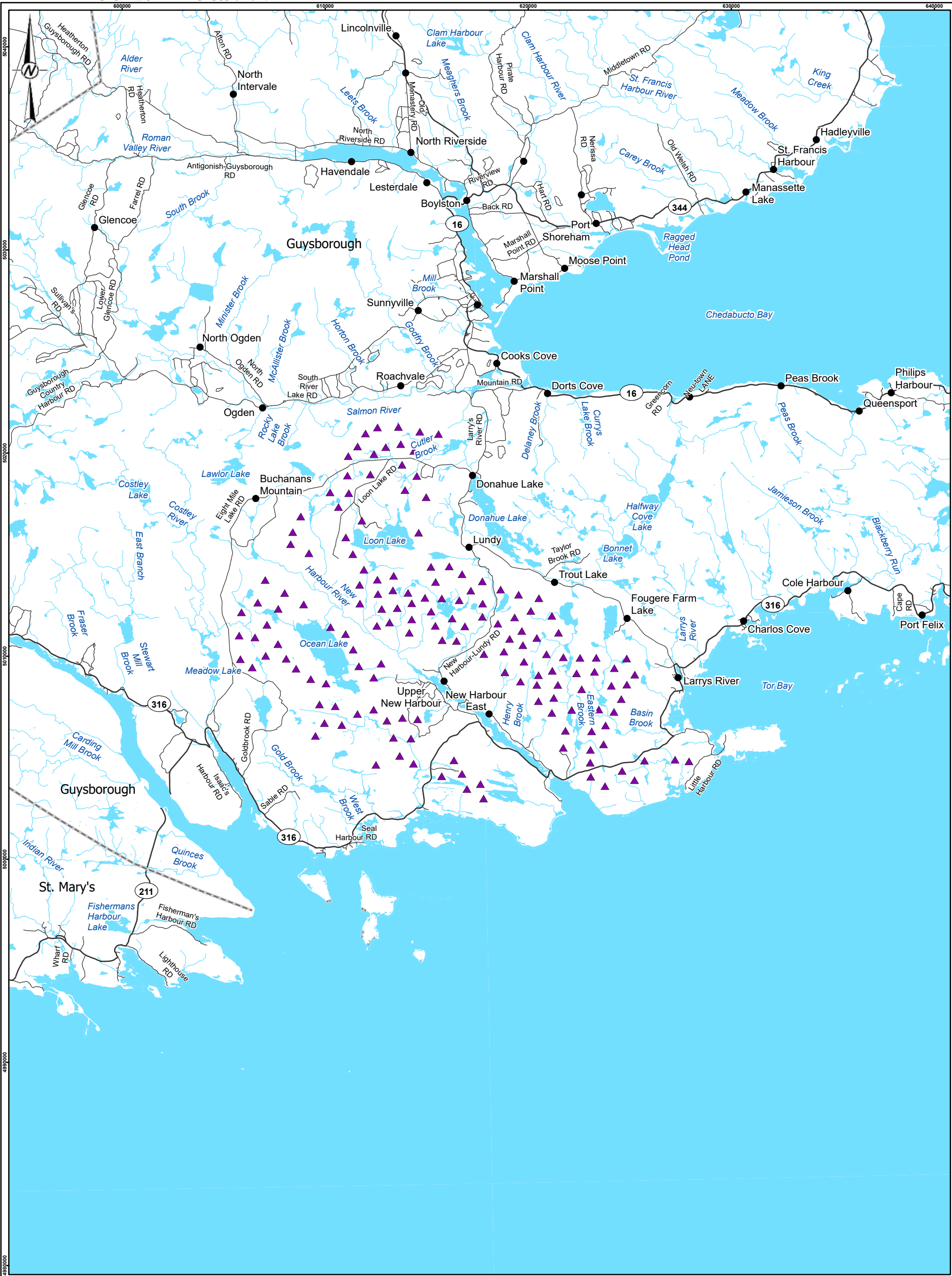
Turbine ID	Coordinates		Base Elevation (m)	Turbine Hub Height (m)	Tip Height (m)	Total Elevation (m)
	Lat	Long				
T96	45° 13' 52.05" N	061° 33' 49.14" W	91.9	130	221.7	313.6
T97	45° 13' 51.01" N	061° 28' 26.48" W	137.0	130	221.7	358.7
T98	45° 13' 49.62" N	061° 38' 40.28" W	89.2	130	221.7	310.9
T99	45° 13' 48.5" N	061° 34' 39.58" W	78.7	130	221.7	300.4

We appreciate your time and input on this matter. Please let us know if you require any additional information or have concerns regarding potential interference.

Sincerely,

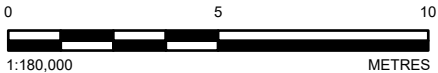
Norberto Lopes Hulle, MSc
He/him
EA Practitioner
WSP Canada

Attachments: Figure 1. Project Location and Turbine Layout



- LEGEND**
- HIGHWAY
 - LOCAL ROAD
 - WATERCOURSE
 - WATERBODY
 - MUNICIPAL BOUNDARY
 - TURBINE LOCATION

DRAFT



CLIENT
EVERWIND FUELS (EWF)

CONSULTANT



YYYY-MM-DD	2026-02-19
DESIGNED	PT
PREPARED	PT
REVIEWED	
APPROVED	

NOTE(S)

REFERENCE(S)

DIGITAL BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
DATUM: NAD83 PROJECTION: UTM ZONE 20

PROJECT
WIND FARM 2

TITLE
TURBINE LAYOUT

PROJECT NO.
CA0066766.3659

CONTROL

REV.
A

FIGURE
1

RE: Wind Farm 2 Wind Project - Electromagnetic Interference

From Stevens, Brendan (he, him, his | il, le, lui) (ISED/ISDE) <Brendan.Stevens@ised-isde.gc.ca>

Date Wed 3/4/2026 12:15 PM

To Lopes Hülle, Norberto <norberto.hulle@wsp.com>

Good Afternoon,

I've completed a search for stations not found in our public database. I have identified a non-disclosed system that will require additional consultation for your project according to the RABC document linked below.

[Technical Information and Coordination Process Between Wind Turbines and Radiocommunication and Radar Systems - RABC-CCCR](#)

Coordination will be required with the Nova Scotia Department of Emergency Management.

I have passed along your contact information to the user to facilitate the consultation process.

Please be sure to conduct a search of ISED's public database at [Search for SMS data](#) to conduct a search for additional users that may require coordination.

If you have any further questions, please let me know.

Regards,

Brendan Stevens
(he, him, his | il, le, lui)

Spectrum Management Officer | Agent de la Gestion du Spectre
Spectrum Management Operations Branch | Direction générale des opérations de la gestion du spectre
Innovation, Science and Economic Development Canada / Government of Canada | Innovation, Sciences et Développement économique Canada / Gouvernement du Canada
50 Brown Avenue, Dartmouth NS B3B 1X8 | 50, avenue Brown, Dartmouth NS B3B 1X8
brendan.stevens@ised-isde.gc.ca
Telephone | Téléphone +1 (902) 489-0339
Government of Canada | Gouvernement du Canada

Receipt of Land Use File #26-1189

From TES_WindTurbines@forces.gc.ca <TES_WindTurbines@forces.gc.ca>

Date Thu 3/12/2026 9:07 AM

To norberto.hulle@wsp.com <norberto.hulle@wsp.com>

Good day,

This email is to inform you that the Department of National Defence (DND) has received your Wind Farm Proposal file through the NAV CANADA Land Use program for the proposed wind farm project file # NAVCAN 26-1189 the Wind Farm 2 wind project near Guysborough County, NS. and to advise you that we may contact you if we require any further information to perform our assessments.

Please allow up to eight weeks for the assessment to be accomplished as several different DND organizations will begin working on your proposal shortly.

Thank you again, if you have any questions please contact us at WindTurbines@forces.gc.ca
The DND website for Wind turbine impact assessment is located at
<https://www.canada.ca/en/air-force/services/wind-turbine-impact-assessment-for-industry.html>

Kind regards,

Respectfully,

MWO / Adjum Jeff Bateman, CD

Staff Officer Aerospace Systems 3
1 Canadian Air Division Headquarters / Canadian NORAD Region
Canadian Armed Forces
jeffrey.bateman2@forces.gc.ca / Tel.: 204-833-2500 ext 2257 / CSN: 257-2257
/ Cell: 431-294-4035

Officier d'État Major Systèmes Aérospatiales 3
1re Division Aérienne du Canada/Région Canadienne du NORAD
Forces armées canadiennes
jeffrey.bateman2@forces.gc.ca / Tel.: 204-833-2500 ext 2257 / CSN: 257-2257
/ 431-294-4035

Protected A

Norberto Lopes Hülle
WSP

GV 1620-7-3

06 March 2026

SUBJECT: Wind Farm 2 Wind Project

Ref. # 2026-03-02_0237

Greetings,

Reference is made to your email request dated February 27, 2026, on your plans for the wind energy project called "Wind Farm 2" in the province of Nova Scotia.

According to the Radio Advisory Board of Canada (RABC) and Canadian Wind Energy Association (CanWea), the radius of the consultation zone for fixed Land Mobile Radio (LMR) sites is 1 km. The RCMP currently have no "owned" radio towers or Point-To-Point (PTP) microwave links in this area.

However, the **surrounding area is receiving radio coverage from TMR2** operated as a leased system through Bell Canada. It is **required** that you request coordination with Bell who are acting on behalf of RCMP in the province of Nova Scotia with leased towers.

Should you require additional information, please direct any questions or concerns to the undersigned.

Sincerely,

Phil Tanguay

Wind Farm Coordinator,
National Radio Services / Digital Program
Royal Canadian Mounted Police (RCMP) / Government of Canada

windfarm_coordinator@rcmp-grc.gc.ca / Tel: 343-552-1290

Coordonnateur parc éolien,
Services de radio nationaux / Programme Numérique
Gendarmerie royale du Canada (GRC) / Gouvernement du Canada

RE: Wind Farm 2 Wind Project - Electromagnetic Interference

From Grégoire, Martin (DFO/MPO) <Martin.Gregoire@dfo-mpo.gc.ca>

Date Mon 3/2/2026 4:31 PM

To Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Unclassified - Non-Classifié

Hello,

The proposed wind farm (Wind Farm 2) is located 30 km away from the Eddy Point (Mulgrave) radar site. Even though it is located within the 60 km consultation zone, it is located beyond the area covered by the radar. Therefore no interference issues are anticipated.

Regards / Salutations,

Martin Grégoire

Canadian Coast Guard
Garde côtière canadienne

From: Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Sent: Friday, 27 February, 2026 9:26 PM

To: CCG Wind Farm Coordinator / Coordinateur Parc Éolien GCC (DFO/MPO) <DFO.CCGWindFarmCoordinator-CoordinateurParcEolienGCC.MPO@dfo-mpo.gc.ca>

Subject: Wind Farm 2 Wind Project - Electromagnetic Interference

You don't often get email from norberto.hulle@wsp.com. [Learn why this is important](#)

Good afternoon,

Please find attached a notification letter about the proposed Wind Farm 2 Wind Project in Guysborough County, Nova Scotia. We are reaching out to request your insights regarding any potential electromagnetic interference related to this project. For your convenience, a KMZ file illustrating the turbine layout is also included.

I would appreciate it if you could confirm that you have received these materials. Should you have any questions or wish to discuss any specific details further, please don't hesitate to get in touch.

Regards,

Norberto Lopes Hülle

EA Practitioner

Intermediate Scientist, MSc

He/him



March 10, 2026

Norberto Lopes Hülle
WSP Canada on behalf of EverWind

Subject: Wind Farm 2 Wind Project

Dear Norberto,

Thank you for contacting the Meteorological Service of Canada, a Branch of Environment and Climate Change Canada (ECCC), regarding your renewable energy project proposal.

When assessing the potential impact of all new wind energy projects, ECCC's main goal is to avoid significant interference with any of ECCC's state-of-the-art weather radars that would hinder the timely and accurate production of watches and warnings of significant weather.

We have reviewed the information that you provided to ECCC via e-mail on February 27, 2026 for the proposed Wind Farm 2 Project (the "Proposed Project") located approximately 123-138 km away from ECCC's Marion Bridge, NS weather radar (the "Weather Radar"). Based on the information provided, our preliminary assessment of the Proposed Project indicates that any potential interference that may be caused should not significantly affect our radar operations. Consequently, we do not have objections to the current Proposed Project operations on the Weather Radar. This being said, if additional wind turbines are proposed in the vicinity of the Weather Radar which might result in cumulative interference on ECCC's weather radar operations, ECCC will monitor these impacts and may contact you to discuss potential mitigation measures.

If your Proposed Project is modified in any manner (e.g. number of turbines, turbine height or placement), this preliminary assessment will no longer be valid and an updated analysis will be conducted by ECCC once all the information regarding the revised Proposed Project has been submitted in a timely matter to ECCC at: radarsmeteo-weatheradars@ec.gc.ca.

If the Proposed Project proceeds through the development process and becomes operational or if the Proposed Project does not proceed, we would appreciate being informed so that we may update our records.

Sincerely,

Matt Arkett

Acting Director, Satellite, Lightning, and Engineering Division
Meteorological Service of Canada, Environment and Climate Change Canada



NAVCANADA Land Use 26-1189 Wind Farm 2

From LandUse@navcanada.ca <LandUse@navcanada.ca>

Date Mon 3/9/2026 4:03 PM

To Lopes Hulle, Norberto <NORBERTO.HULLE@WSP.COM>; Bonazza, Jeff <jeff.bonazza@everwindfuels.com>;
Hulle, Norberto <norberto.hulle@wsp.com>; norberto.hulle@wsp.com <norberto.hulle@wsp.com>

Good day / Bonjour La version française figure ci - dessous / French Text Follows

Thank you for your submission, your Land Use file number is 26-1189. Please reference this number for all transactions on this submission. At NAV CANADA, we are currently working on different ways to diminish our turnaround times. Please note that we currently have the following time frame published on our website:

Processing times vary, but NAV CANADA attempts to respond within 8 to 12 weeks of receiving a complete proposal. The accuracy and completeness of the initial documentation and your cooperation and promptness in remedying deficiencies or inaccuracies will help to expedite the review process.

If you have any questions or would like an update of your file, please do not hesitate to contact us.

/

Merci pour votre soumission. Votre numéro de dossier d'utilisation de terrain est 26-1189. Veuillez mentionner ce numéro pour toutes les transactions reliées sur cette soumission. Chez NAV CANADA, nous travaillons actuellement sur différentes façons de réduire nos délais d'exécution. Veuillez noter que nous avons actuellement le délai suivant publié sur notre site Web:

Les délais de traitement varient selon l'exhaustivité et l'exactitude des renseignements soumis et selon la complexité du projet. En général, NAV CANADA tente de répondre dans un délai de 8 à 12 semaines.

N'hésitez pas à nous contacter si vous avez des questions ou souhaitez une mise à jour de votre dossier

Regards / Cordialement

Proposal Summary/ Détails de la proposition

Proponent Information / Information sur le promoteur

Applicant Name / Nom du demandeur

Norberto Lopes Hulle

Applicant Address / Adresse du demandeur

Phone number / Numéro de téléphone	
Cell number / Numéro de cellulaire	
E-mail address / Adresse courriel	NORBERTO.HULLE@WSP.COM

Owner Information / Information sur le propriétaire

Owner Name / Nom du propriétaire	Jeff Bonazza
Owner Address / Adresse du propriétaire	
Phone number / Numéro de téléphone	
Cell number / Numéro de cellulaire	
E-mail address / Adresse courriel	jeff.bonazza@everwindfuels.com

Project Information / Information sur le projet

Project Identification / Désignation du projet	Wind Farm 2
Nearest Town / Ville la plus proche	Guysborough NS
Proposed new construction start date / Date proposée pour le début des nouvelles constructions	2027-04-01
Proposed completion date / Date d'achèvement proposée	
Is the current work on NAVCANADA land? / Les travaux en cours sur le territoire de NAV CANADA sont-ils effectués ?	No
Additional Comments / Commentaires additionnels	

Obstacle Information / Information sur l'obstacle

Obstacle Description / Description de l'obstacle	158 Turbine Wind Farm Project
Land Use Type / Type d'utilisation de terrains	Wind Turbine(s) / Éolienne(s)
Has Crane / Grues utilisées?	No / Non

Obstacle(s)

Id	Longitude	Latitude	Ground / Sol	Height / Hauteur	Radius / Rayon
T1	45 20 09.1300	-061 33 00.5200	621.324494948 ft/pi	727.362228 ft/pi	0 ft/pi
T10	45 19 26.5800	-061 33 56.9500	466.002967668 ft/pi	727.362228 ft/pi	0 ft/pi
T100	45 13 46.4400	-061 37 01.3900	319.141086328 ft/pi	727.362228 ft/pi	0 ft/pi

T101	45 13 37.9200	-061 25 02.8500	285.39469417199996 ft/pi	727.362228 ft/pi	0 ft/pi
T102	45 13 35.7400	-061 27 23.0600	360.73984094 ft/pi	727.362228 ft/pi	0 ft/pi
T103	45 13 34.7700	-061 29 09.9600	340.10237308800004 ft/pi	727.362228 ft/pi	0 ft/pi
T104	45 13 32.9100	-061 25 47.7900	301.021663176 ft/pi	727.362228 ft/pi	0 ft/pi
T105	45 13 30.8300	-061 26 28.3000	308.18898624 ft/pi	727.362228 ft/pi	0 ft/pi
T106	45 13 30.0400	-061 34 06.3600	217.133537132 ft/pi	727.362228 ft/pi	0 ft/pi
T107	45 13 29.4000	-061 36 28.7200	273.136163596 ft/pi	727.362228 ft/pi	0 ft/pi
T108	45 13 29.1000	-061 27 54.3800	355.66930272 ft/pi	727.362228 ft/pi	0 ft/pi
T109	45 13 27.0200	-061 24 16.9100	258.0216618 ft/pi	727.362228 ft/pi	0 ft/pi
T11	45 19 24.0000	-061 34 55.1200	531.832038016 ft/pi	727.362228 ft/pi	0 ft/pi
T110	45 13 21.9100	-061 35 54.2400	181.918969076 ft/pi	727.362228 ft/pi	0 ft/pi
T111	45 13 19.4400	-061 28 35.2600	402.18472415599996 ft/pi	727.362228 ft/pi	0 ft/pi
T112	45 13 13.6900	-061 27 58.3900	340.75788492 ft/pi	727.362228 ft/pi	0 ft/pi
T113	45 13 12.9600	-061 27 11.0200	365.81726892399996 ft/pi	727.362228 ft/pi	0 ft/pi
T114	45 13 11.3300	-061 24 35.2300	262.494102888 ft/pi	727.362228 ft/pi	0 ft/pi
T115	45 13 10.0700	-061 25 10.2800	305.97605966 ft/pi	727.362228 ft/pi	0 ft/pi
T116	45 13 05.3600	-061 26 17.4900	197.47047876 ft/pi	727.362228 ft/pi	0 ft/pi
T117	45 12 52.4000	-061 27 20.8000	286.37468108 ft/pi	727.362228 ft/pi	0 ft/pi
T118	45 12 48.7600	-061 36 09.9500	235.521989164 ft/pi	727.362228 ft/pi	0 ft/pi
T119	45 12 48.3700	-061 24 48.5100	211.725400476 ft/pi	727.362228 ft/pi	0 ft/pi

T12	45 19 08.7100	-061 32 53.8500	439.91011906399996 ft/pi	727.362228 ft/pi	0 ft/pi
T120	45 12 47.7300	-061 27 55.6200	361.04627139599995 ft/pi	727.362228 ft/pi	0 ft/pi
T121	45 12 45.4100	-061 35 34.3900	232.47277646799998 ft/pi	727.362228 ft/pi	0 ft/pi
T122	45 12 38.9000	-061 34 07.9000	179.318575292 ft/pi	727.362228 ft/pi	0 ft/pi
T123	45 12 32.7500	-061 26 40.8400	165.706042048 ft/pi	727.362228 ft/pi	0 ft/pi
T124	45 12 32.5000	-061 25 39.7000	138.84678922 ft/pi	727.362228 ft/pi	0 ft/pi
T125	45 12 32.4200	-061 34 44.6400	195.657486576 ft/pi	727.362228 ft/pi	0 ft/pi
T126	45 12 28.6000	-061 27 25.7700	310.196204152 ft/pi	727.362228 ft/pi	0 ft/pi
T127	45 12 28.2900	-061 25 05.5700	83.910435756 ft/pi	727.362228 ft/pi	0 ft/pi
T128	45 12 24.9200	-061 33 03.2000	206.107946228 ft/pi	727.362228 ft/pi	0 ft/pi
T129	45 12 22.2400	-061 32 28.9400	169.605976556 ft/pi	727.362228 ft/pi	0 ft/pi
T13	45 18 54.1200	-061 34 05.8900	485.772981424 ft/pi	727.362228 ft/pi	0 ft/pi
T130	45 12 20.9400	-061 33 38.3600	179.4127354 ft/pi	727.362228 ft/pi	0 ft/pi
T131	45 12 18.9300	-061 35 59.5000	279.463263536 ft/pi	727.362228 ft/pi	0 ft/pi
T132	45 12 15.2800	-061 35 20.4100	205.563654872 ft/pi	727.362228 ft/pi	0 ft/pi
T133	45 12 06.9600	-061 25 25.1300	143.09514893600002 ft/pi	727.362228 ft/pi	0 ft/pi
T134	45 11 59.7100	-061 26 55.9200	175.900924264 ft/pi	727.362228 ft/pi	0 ft/pi
T135	45 11 58.7200	-061 36 20.3100	215.71523 ft/pi	727.362228 ft/pi	0 ft/pi
T136	45 11 58.0300	-061 25 56.7800	206.09022969199998 ft/pi	727.362228 ft/pi	0 ft/pi
T137	45 11 53.5000	-061 33 24.2500	137.238849536 ft/pi	727.362228 ft/pi	0 ft/pi

T138	45 11 51.8000	-061 32 44.8200	121.90518762800001 ft/pi	727.362228 ft/pi	0 ft/pi
T139	45 11 36.8600	-061 25 30.4800	124.77132945199999 ft/pi	727.362228 ft/pi	0 ft/pi
T14	45 18 52.9600	-061 34 57.7800	493.2496877 ft/pi	727.362228 ft/pi	0 ft/pi
T140	45 11 32.5900	-061 27 01.4800	171.255254824 ft/pi	727.362228 ft/pi	0 ft/pi
T141	45 11 28.3800	-061 26 00.2500	130.308731204 ft/pi	727.362228 ft/pi	0 ft/pi
T142	45 11 24.4600	-061 33 10.8900	164.935044648 ft/pi	727.362228 ft/pi	0 ft/pi
T143	45 11 15.8900	-061 31 08.7900	133.069558064 ft/pi	727.362228 ft/pi	0 ft/pi
T144	45 11 11.5700	-061 32 40.1200	91.72244388 ft/pi	727.362228 ft/pi	0 ft/pi
T145	45 11 10.8200	-061 34 04.9000	185.16273558400002 ft/pi	727.362228 ft/pi	0 ft/pi
T146	45 11 10.0800	-061 22 49.8500	51.876642079999996 ft/pi	727.362228 ft/pi	0 ft/pi
T147	45 11 09.5300	-061 23 58.8600	61.212600384 ft/pi	727.362228 ft/pi	0 ft/pi
T148	45 11 08.0500	-061 26 01.3800	135.723101456 ft/pi	727.362228 ft/pi	0 ft/pi
T149	45 11 07.0000	-061 22 18.4700	45.352363656 ft/pi	727.362228 ft/pi	0 ft/pi
T15	45 18 50.2800	-061 32 20.9200	450.011825424 ft/pi	727.362228 ft/pi	0 ft/pi
T150	45 10 53.9500	-061 30 51.2000	110.974741084 ft/pi	727.362228 ft/pi	0 ft/pi
T151	45 10 53.9100	-061 24 49.8200	108.57775937999999 ft/pi	727.362228 ft/pi	0 ft/pi
T152	45 10 50.8600	-061 31 37.0500	123.687668 ft/pi	727.362228 ft/pi	0 ft/pi
T153	45 10 45.5600	-061 26 00.8000	139.23622492799998 ft/pi	727.362228 ft/pi	0 ft/pi
T154	45 10 38.7800	-061 24 22.2000	77.543965736 ft/pi	727.362228 ft/pi	0 ft/pi
T155	45 10 37.1700	-061 30 09.9000	122.996395012 ft/pi	727.362228 ft/pi	0 ft/pi

T156	45 10 30.1200	-061 25 29.0500	109.550200356 ft/pi	727.362228 ft/pi	0 ft/pi
T157	45 10 29.6300	-061 30 40.6100	103.335305144 ft/pi	727.362228 ft/pi	0 ft/pi
T158	45 10 14.0100	-061 30 03.4500	82.705711308 ft/pi	727.362228 ft/pi	0 ft/pi
T16	45 18 28.1900	-061 32 48.2100	496.383546068 ft/pi	727.362228 ft/pi	0 ft/pi
T17	45 18 26.7500	-061 35 37.7500	478.27330926800005 ft/pi	727.362228 ft/pi	0 ft/pi
T18	45 18 24.9300	-061 34 55.5000	495.29890036399996 ft/pi	727.362228 ft/pi	0 ft/pi
T19	45 18 16.3700	-061 32 00.6300	495.89371665600004 ft/pi	727.362228 ft/pi	0 ft/pi
T2	45 20 08.9400	-061 33 47.8300	681.621740972 ft/pi	727.362228 ft/pi	0 ft/pi
T20	45 18 03.0300	-061 35 19.2900	499.05021282 ft/pi	727.362228 ft/pi	0 ft/pi
T21	45 17 49.0900	-061 36 44.9400	520.459006156 ft/pi	727.362228 ft/pi	0 ft/pi
T22	45 17 40.6900	-061 34 26.7500	453.141090616 ft/pi	727.362228 ft/pi	0 ft/pi
T23	45 17 24.3300	-061 37 03.6000	598.25789316 ft/pi	727.362228 ft/pi	0 ft/pi
T24	45 17 19.8300	-061 32 19.0600	473.63354533999996 ft/pi	727.362228 ft/pi	0 ft/pi
T25	45 17 14.4200	-061 35 03.8900	447.87567049999996 ft/pi	727.362228 ft/pi	0 ft/pi
T26	45 17 05.1900	-061 37 08.9100	533.6325630079999 ft/pi	727.362228 ft/pi	0 ft/pi
T27	45 16 47.5500	-061 34 48.7200	475.586957476 ft/pi	727.362228 ft/pi	0 ft/pi
T28	45 16 50.2500	-061 36 27.7900	435.41996144 ft/pi	727.362228 ft/pi	0 ft/pi
T29	45 16 25.2700	-061 31 11.3300	575.7329580559999 ft/pi	727.362228 ft/pi	0 ft/pi
T3	45 20 00.8900	-061 32 12.3000	498.970816492 ft/pi	727.362228 ft/pi	0 ft/pi
T30	45 16 25.0700	-061 31 52.6900	581.892735156 ft/pi	727.362228 ft/pi	0 ft/pi

T31	45 16 22.5100	-061 34 24.2500	422.18177204000006 ft/pi	727.362228 ft/pi	0 ft/pi
T32	45 16 12.4000	-061 30 42.6800	508.695554336 ft/pi	727.362228 ft/pi	0 ft/pi
T33	45 16 11.8400	-061 33 17.3500	495.04922844 ft/pi	727.362228 ft/pi	0 ft/pi
T34	45 16 08.7000	-061 38 07.6700	369.152242784 ft/pi	727.362228 ft/pi	0 ft/pi
T35	45 16 06.1100	-061 33 54.2800	481.635842184 ft/pi	727.362228 ft/pi	0 ft/pi
T36	45 16 00.8400	-061 31 42.7900	598.983943052 ft/pi	727.362228 ft/pi	0 ft/pi
T37	45 16 00.5100	-061 29 57.1400	380.805130296 ft/pi	727.362228 ft/pi	0 ft/pi
T38	45 15 58.3900	-061 34 34.5700	423.719173664 ft/pi	727.362228 ft/pi	0 ft/pi
T39	45 15 48.6800	-061 33 19.6200	491.96261416799996 ft/pi	727.362228 ft/pi	0 ft/pi
T4	45 19 59.5600	-061 34 15.1700	421.908149984 ft/pi	727.362228 ft/pi	0 ft/pi
T40	45 15 47.4200	-061 37 24.2700	332.377635308 ft/pi	727.362228 ft/pi	0 ft/pi
T41	45 15 46.8100	-061 29 16.2300	292.8067679 ft/pi	727.362228 ft/pi	0 ft/pi
T42	45 15 45.9500	-061 30 23.5800	416.947847988 ft/pi	727.362228 ft/pi	0 ft/pi
T43	45 15 44.2900	-061 32 45.5900	523.5869590120001 ft/pi	727.362228 ft/pi	0 ft/pi
T44	45 15 43.2000	-061 33 53.6100	431.683412764 ft/pi	727.362228 ft/pi	0 ft/pi
T45	45 15 38.0700	-061 28 35.8100	340.221795664 ft/pi	727.362228 ft/pi	0 ft/pi
T46	45 15 35.8500	-061 32 07.4600	547.501329856 ft/pi	727.362228 ft/pi	0 ft/pi
T47	45 15 34.3500	-061 31 29.5400	389.1650387 ft/pi	727.362228 ft/pi	0 ft/pi
T48	45 15 32.7900	-061 38 25.4700	211.47966556 ft/pi	727.362228 ft/pi	0 ft/pi
T49	45 15 31.9300	-061 27 50.1400	415.216876804 ft/pi	727.362228 ft/pi	0 ft/pi

T5	45 19 56.5900	-061 31 30.1200	390.320878632 ft/pi	727.362228 ft/pi	0 ft/pi
T50	45 15 30.9800	-061 30 50.1400	426.03675904 ft/pi	727.362228 ft/pi	0 ft/pi
T51	45 15 28.7300	-061 36 41.8100	262.546924412 ft/pi	727.362228 ft/pi	0 ft/pi
T52	45 15 28.5100	-061 34 34.6800	424.173898088 ft/pi	727.362228 ft/pi	0 ft/pi
T53	45 15 27.5200	-061 32 37.5400	561.536763376 ft/pi	727.362228 ft/pi	0 ft/pi
T54	45 15 25.0300	-061 29 57.4700	393.013792104 ft/pi	727.362228 ft/pi	0 ft/pi
T55	45 15 22.3900	-061 37 39.4700	229.4537475 ft/pi	727.362228 ft/pi	0 ft/pi
T56	45 15 20.1600	-061 33 10.4400	502.55972736800004 ft/pi	727.362228 ft/pi	0 ft/pi
T57	45 15 19.2800	-061 33 45.6100	423.70933114400003 ft/pi	727.362228 ft/pi	0 ft/pi
T58	45 15 17.9100	-061 39 02.5900	206.933077488 ft/pi	727.362228 ft/pi	0 ft/pi
T59	45 15 13.6500	-061 31 54.0300	549.837944104 ft/pi	727.362228 ft/pi	0 ft/pi
T6	45 19 41.5600	-061 32 56.0200	530.1335471479999 ft/pi	727.362228 ft/pi	0 ft/pi
T60	45 15 11.8600	-061 28 08.9100	382.281180212 ft/pi	727.362228 ft/pi	0 ft/pi
T61	45 15 03.8600	-061 29 58.5900	309.47507552 ft/pi	727.362228 ft/pi	0 ft/pi
T62	45 15 03.2900	-061 27 21.5800	287.231636488 ft/pi	727.362228 ft/pi	0 ft/pi
T63	45 15 02.1600	-061 31 06.8500	371.187347836 ft/pi	727.362228 ft/pi	0 ft/pi
T64	45 15 01.9800	-061 28 45.7800	376.813660352 ft/pi	727.362228 ft/pi	0 ft/pi
T65	45 15 01.8300	-061 32 38.2000	479.179477276 ft/pi	727.362228 ft/pi	0 ft/pi
T66	45 14 57.4100	-061 33 28.5800	439.71720567200003 ft/pi	727.362228 ft/pi	0 ft/pi
T67	45 14 57.2900	-061 38 05.4500	239.06792103600003 ft/pi	727.362228 ft/pi	0 ft/pi

T68	45 14 52.4700	-061 29 23.8800	387.011495324 ft/pi	727.362228 ft/pi	0 ft/pi
T69	45 14 52.5200	-061 33 57.1900	323.082687504 ft/pi	727.362228 ft/pi	0 ft/pi
T7	45 19 39.0900	-061 34 33.6400	467.528558268 ft/pi	727.362228 ft/pi	0 ft/pi
T70	45 14 51.7700	-061 35 42.0600	164.46719686400002 ft/pi	727.362228 ft/pi	0 ft/pi
T71	45 14 50.9800	-061 31 45.2600	538.7165526719999 ft/pi	727.362228 ft/pi	0 ft/pi
T72	45 14 49.2100	-061 30 38.5000	444.34942366800004 ft/pi	727.362228 ft/pi	0 ft/pi
T73	45 14 40.8000	-061 39 08.6500	195.939638816 ft/pi	727.362228 ft/pi	0 ft/pi
T74	45 14 40.5600	-061 32 44.2600	358.115825108 ft/pi	727.362228 ft/pi	0 ft/pi
T75	45 14 40.3400	-061 35 08.2000	209.745085452 ft/pi	727.362228 ft/pi	0 ft/pi
T76	45 14 40.0900	-061 28 30.1300	459.516418904 ft/pi	727.362228 ft/pi	0 ft/pi
T77	45 14 37.4700	-061 38 33.0300	186.725399676 ft/pi	727.362228 ft/pi	0 ft/pi
T78	45 14 36.1300	-061 27 07.2200	290.06004865200003 ft/pi	727.362228 ft/pi	0 ft/pi
T79	45 14 28.5600	-061 27 56.5400	373.5072298 ft/pi	727.362228 ft/pi	0 ft/pi
T8	45 19 37.3000	-061 33 30.0100	518.1325625119999 ft/pi	727.362228 ft/pi	0 ft/pi
T80	45 14 27.8500	-061 28 57.9800	443.16504042799994 ft/pi	727.362228 ft/pi	0 ft/pi
T81	45 14 27.8000	-061 31 30.2600	358.01018206 ft/pi	727.362228 ft/pi	0 ft/pi
T82	45 14 26.1800	-061 37 41.3700	275.227699096 ft/pi	727.362228 ft/pi	0 ft/pi
T83	45 14 26.1300	-061 30 58.0600	320.78708375599996 ft/pi	727.362228 ft/pi	0 ft/pi
T84	45 14 17.5100	-061 28 28.3100	473.050211988 ft/pi	727.362228 ft/pi	0 ft/pi
T85	45 14 15.2600	-061 34 51.7100	241.29823606800002 ft/pi	727.362228 ft/pi	0 ft/pi

T86	45 14 07.8600	-061 38 09.5600	275.763460268 ft/pi	727.362228 ft/pi	0 ft/pi
T87	45 14 07.6800	-061 29 11.3000	399.794304132 ft/pi	727.362228 ft/pi	0 ft/pi
T88	45 14 04.3700	-061 29 56.6400	275.765756856 ft/pi	727.362228 ft/pi	0 ft/pi
T89	45 14 03.1900	-061 39 06.8200	267.663722476 ft/pi	727.362228 ft/pi	0 ft/pi
T9	45 19 30.3700	-061 32 26.5500	426.349423092 ft/pi	727.362228 ft/pi	0 ft/pi
T90	45 14 02.6800	-061 37 23.3300	297.812345488 ft/pi	727.362228 ft/pi	0 ft/pi
T91	45 14 02.2700	-061 27 35.3900	382.046272068 ft/pi	727.362228 ft/pi	0 ft/pi
T92	45 13 56.9500	-061 26 57.4800	296.887476692 ft/pi	727.362228 ft/pi	0 ft/pi
T93	45 13 55.4600	-061 26 19.7400	307.809064968 ft/pi	727.362228 ft/pi	0 ft/pi
T94	45 13 55.1200	-061 25 43.1600	358.19128442799996 ft/pi	727.362228 ft/pi	0 ft/pi
T95	45 13 52.9700	-061 24 34.4700	317.425863176 ft/pi	727.362228 ft/pi	0 ft/pi
T96	45 13 52.0500	-061 33 49.1400	301.576125136 ft/pi	727.362228 ft/pi	0 ft/pi
T97	45 13 51.0100	-061 28 26.4800	449.559725672 ft/pi	727.362228 ft/pi	0 ft/pi
T98	45 13 49.6200	-061 38 40.2800	292.73458941999996 ft/pi	727.362228 ft/pi	0 ft/pi
T99	45 13 48.5000	-061 34 39.5800	258.040690672 ft/pi	727.362228 ft/pi	0 ft/pi

Supporting Information / Information à l'appui

Related Land Use file number / Numéro de dossier
d'utilisation de terrains précédent

Correspondance Language / Langue de correspondance

Attached Files / Fichiers joints

English

26-1189 WF2 EMI Letter NAV
Canada.pdf
26-1189 WF2_Layout.kmz
26-1189 NAVCANADA Obstacle
Template WF2.xlsx

Other parties to be informed / Autres parties à informer

norberto.hulle@wsp.com

Land Use Department

AERONAUTICAL INFORMATION MANAGEMENT(AIM)

NAV CANADA

landuse@navcanada.ca

1601 Avenue Tom Roberts Avenue Ottawa, ON K1V 1E5

F.613-248-4094

www.navcanada.ca

Re: Windfarm Telecom Tower Coordination

From Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Date Wed 3/11/2026 8:52 AM

To Moffat, Jeffrey <Jeffrey.Moffat@novascotia.ca>

Cc Stevens, Brendan (he, him, his | il, le, lui) (ISED/ISDE) <Brendan.Stevens@ised-isde.gc.ca>; PSFCTowers <PSFCTowers@novascotia.ca>

 3 attachments (2 MB)

WF2 turbine data.xlsx; WF2_Layout.kmz; WF2 EMI Letter PSFC.pdf;

Good morning, Jeff

Thanks for reaching out. Brendan informed me of the potential interference and that you would be in touch.

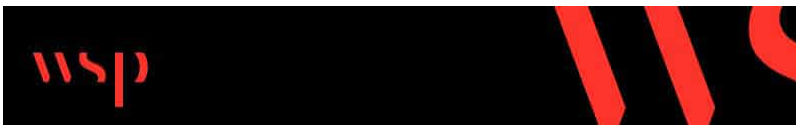
Please find attached a letter with the project information, as well as a KMZ file and an excel spreadsheet with the locations.

Please let me know if there's anything else you may need for your assessment.

Thanks,
Beto

Norberto Lopes Hülle
EA Practitioner
Intermediate Scientist, MSc.
He/him

M +1 647-546-8208 (NEW)



From: Moffat, Jeffrey <Jeffrey.Moffat@novascotia.ca>

Sent: Monday, March 9, 2026 7:26 PM

To: Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Cc: Stevens, Brendan (he, him, his | il, le, lui) (ISED/ISDE) <Brendan.Stevens@ised-isde.gc.ca>; PSFCTowers <PSFCTowers@novascotia.ca>

Subject: Windfarm Telecom Tower Coordination

Hello Norberto

My name is Jeffrey Moffat and I am the Mobile Radio Service Manager at Nova Scotia Public Safety Field Communications. As part of my duties, I manage all the Telecommunications Tower and supporting Infrastructure owned by the Province of Nova Scotia. I was recently contacted by one of our local ISED Spectrum Management Officers that your company is working on a proposed windfarm near our Telecommunications Tower at 3626 Larry's River Road, West Cook's Cove, Guysborough County, Nova Scotia. Would you be able to provide us with a copy of the proposed locations of all the turbines in this farm so we can make sure they wont have any negative effect on our Public Safety Radio Network, including microwave data paths to adjacent sites.

Thanks

Jeff



Jeffrey Moffat
Service Manager
Department of Emergency
Management
Phone: (902) 499-3163

Re: Wind Farm 2 Wind Project - Electromagnetic Interference

From MacLeod, Michael <Dale.MacLeod@nshealth.ca>
Date Wed 4/1/2026 2:35 PM
To Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Hi Norberto,

I sent along the information, and no concerns were relayed back to me.

Thanks,

Dale

From: Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>
Sent: Wednesday, April 1, 2026 2:32:30 PM
To: MacLeod, Michael <Dale.MacLeod@nshealth.ca>
Subject: Re: Wind Farm 2 Wind Project - Electromagnetic Interference

** EXTERNAL EMAIL / COURRIEL EXTERNE **

Exercise caution when opening attachments or clicking on links / Faites preuve de prudence si vous ouvrez une pièce jointe ou cliquez sur un lien

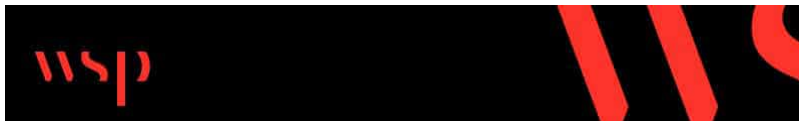
Hello, Dale

Do you have any updates on the potential interference with the helipad?

Thanks!

Norberto Lopes Hülle
EA Practitioner
Intermediate Scientist, MSc.
He/him

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Wind Farm 2 Wind Project - Electromagnetic Interference

From Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Date Wed 4/1/2026 4:51 PM

To Shawn Andrews <sandrews@modg.ca>

 2 attachments (453 KB)

WF2 EMI Letter Fire Assosiation Guysborough.pdf; WF2_Layout.kmz;

Good afternoon, Sean

Please find attached a notification letter about the proposed **Wind Farm 2** Wind Project in Guysborough County, Nova Scotia. We are reaching out to request your insights regarding any potential electromagnetic interference related to this project. For your convenience, a KMZ file illustrating the turbine layout is also included.

We have issued similar correspondence to Nova Scotia Public Safety Field Communications.

I would appreciate it if you could confirm that you have received these materials. Should you have any questions or wish to discuss any specific details further, please don't hesitate to get in touch.

Regards,

Norberto Lopes Hülle

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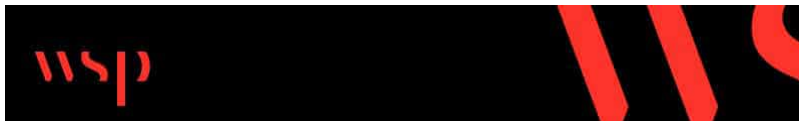
WSP

50 Troop Avenue

Dartmouth, Nova Scotia

B3B 1Z1 Canada

wsp.com



RE: Wind Farm 2 Wind Project - Electromagnetic Interference

From Popescu, Virgil <virgil.popescu@bell.ca>

Date Mon 3/30/2026 1:55 PM

To Saini, Sunny <sunny.saini@bell.ca>; Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>; Butler, Joel <Joel.Butler@bellaliant.ca>; Donkor, Enyonam <enyonam.donkor@bell.ca>; Gibicar, Robert A <rob.gibicar@bell.ca>

Hello Norberto.

Proposed wind farm developments Upper Afton and Wind Farm 2 Guysborough County in Nova Scotia are unlikely to affect the operations of any existing Bell terrestrial microwave link.

I forwarded your notification/request to my colleagues in Bell for assessment of risk to any of the existing infrastructure providing cellular service.

There's some concern related to the turbines planned for the Wind Farm 3 project. Details will be provided in a separate message.

Best regards,



Virgil Popescu | Senior Advisor

Wireless Network Connectivity Engineering

1 Carrefour A-G Bell B3, Verdun, QC H3E 3B3

virgil.popescu@bell.ca // 1-514-796-3949

From: Saini, Sunny <sunny.saini@bell.ca>

Sent: March-30-26 11:10 AM

To: Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>; Popescu, Virgil <virgil.popescu@bell.ca>; Butler, Joel <Joel.Butler@bellaliant.ca>; Donkor, Enyonam <enyonam.donkor@bell.ca>; Gibicar, Robert A <rob.gibicar@bell.ca>

Subject: RE: Wind Farm 2 Wind Project - Electromagnetic Interference

+ [@Gibicar, Robert A](#)

Thanks,



Sunny Saini

Wireless Network Operations | Bell Mobility Inc.

Electromagnetic Interference - Wind Farm 2 Wind Project

From Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Date Wed 4/1/2026 4:37 PM

To wireless.eng@rci.rogers.com <wireless.eng@rci.rogers.com>; spectrum.operations@rci.rogers.com
<spectrum.operations@rci.rogers.com>; spectrum.requests@rci.rogers.com
<spectrum.requests@rci.rogers.com>

 2 attachments (2 MB)

WF2_Layout.kmz; WF2 EMI Letter Rogers.pdf;

Good afternoon,

Please find attached a notification letter about the proposed **Wind Farm 2** Wind Project in Guysborough County, Nova Scotia. We are reaching out to request your insights regarding any potential electromagnetic interference related to this project. For your convenience, a KMZ file illustrating the turbine layout is also included.

I would appreciate it if you could confirm that you have received these materials. Should you have any questions or wish to discuss any specific details further, please don't hesitate to get in touch.

Regards,

Norberto Lopes Hülle

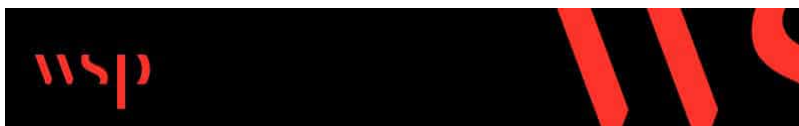
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RE: Wind Farm 2 Wind Project - Electromagnetic Interference

From Andrew MacVicar <Andrew.MacVicar@corp.eastlink.ca>

Date Thu 4/2/2026 7:25 AM

To Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Good morning Norberto,

I have shared your information with our Engineering team, and they will be in touch should they have any questions or concerns.

Thanks,
Andrew

Andrew MacVicar | Manager Customer Experience

Eastlink | Continuous Improvement

Andrew.MacVicar@corp.eastlink.ca

From: Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Sent: Wednesday, April 1, 2026 4:35 PM

To: For the office of Jeff Gillham, Chief Executive Officer <CEO@corp.eastlink.ca>; Andrew MacVicar <Andrew.MacVicar@corp.eastlink.ca>

Subject: Wind Farm 2 Wind Project - Electromagnetic Interference

Good afternoon,

Please find attached a notification letter about the proposed **Wind Farm 2** Wind Project in Guysborough County, Nova Scotia. We are reaching out to request your insights regarding any potential electromagnetic interference related to this project. For your convenience, a KMZ file illustrating the turbine layout is also included.

I would appreciate it if you could confirm that you have received these materials. Should you have any questions or wish to discuss any specific details further, please don't hesitate to get in touch.

Regards,

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50 Troop Avenue

Dartmouth, Nova Scotia

B3B 1Z1 Canada

Re: Upper Afton Wind Project - Electromagnetic Interference

From Network Operations Centre <noc@seaside.ns.ca>

Date Tue 4/7/2026 10:20 AM

To Lopes Hülle, Norberto <Norberto.Hulle@wsp.com>

Hi Noberto,

The helpdesk forwarded me your email the other day and I did look it over. We do have wireless towers in the area, so I sent it to the engineers. Currently awaiting their response, but I'll reach out again. I know they would be delayed a bit due to the holiday weekend, but I'll see if I can get an answer.

Thanks,

Gavin Samson
Critical NOC Analyst
Seaside Communications
noc@seaside.ns.ca
902-539-2353

On 4/7/2026 9:33 AM, Lopes Hülle, Norberto wrote:

Good morning, Gavin

I recently sent the notification of 2 other Wind Farm projects to Seaside, but the latest e-mail returned.

Did you get those e-mails?

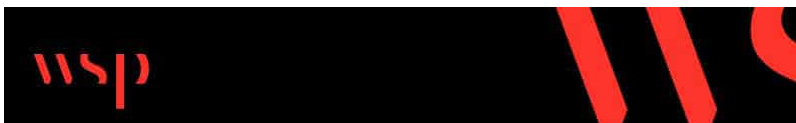
I attached them here for convenience.

Thanks!

Norberto

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